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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

HUNTERIAN LECTURE on Chronic Mastitis. By GEOFFREY KEYNES, M.D., F.R.C.S. (*With Illustrations on Special Plate.*) 439

ORIGINAL ARTICLES.

The Operative Treatment of Vesical Diverticula. By J. SWIFT JOLY, F.R.C.S. (*With Illustrations on Special Plate*) .. 445

Some Observations on Striæ Distensæ. By F. BEDO HOBBS, M.B., B.Ch., D.P.H. (*With Illustration on Special Plate*) 452

Home Disinfection and the Control of Scarlet Fever. By K. SIMPSON, M.D., M.R.C.P., D.P.H. (*Illustrated*) 455

BRITISH MEDICAL ASSOCIATION.

Annual Meeting at Portsmouth.

Section of Neurology and Psychological Medicine: The Nervous Child.—Sequelæ of Encephalitis Lethargica.—Prognosis of Psychoses During Adolescence 457

REVIEWS AND NOTICES OF BOOKS.

Biomathematics: Being the Principles of Mathematics for Students of Biological Science. By W. M. Feldman, M.D., B.S., F.R.S. With an Introduction by Sir William M. Bayliss, D.Sc., F.R.S. 463

Inborn Errors of Metabolism. By Prof. Archibald E. Garrod, K.C.M.G., D.M., LL.D., F.R.S., F.R.C.P. 464

The Debt of Medicine to the Fine Arts. By J. A. Nixon, C.M.G., M.D., F.R.C.P. 464

Grundzüge der Lichtbiologie und Lichtpathologie. By Prof. Walther Hausmann 464

Handbuch der mikrobiologischen Technik. By Prof. Dr. Rudolf Kraus und Prof. Dr. Paul Uhlenhuth 465

Handbook of Physiology. By Prof. W. D. Halliburton, M.D., LL.D., F.R.C.P., F.R.S. 465

Quarterly Journal of Medicine 465

British Journal of Ophthalmology 466

American Journal of Ophthalmology 466

LEADING ARTICLES.

POST-HOLIDAY LASSITUDE 467

DIVERTICULUM OF THE BLADDER 467

OPERATIONS ON THE CARDIAC NERVES IN ANGINA PECTORIS 468

THE FOURTH YEAR OF THE HEALTH MINISTRY 469

JOINT ACTION AGAINST VENEREAL DISEASES .. 469

ANNOTATIONS.

British Association at Liverpool 470

Dust Inhalation and Pulmonary Disease 470

British Journal of Anæsthesia 471

Free Insulin 471

The Histological Study of Neoplasms 471

Cardio-Vascular Complications of Kyphoscoliosis.. 471

Life Assurance and Syphilis 472

Edible Fungi 472

Value in Disinfection 472

The Sedimentation Rate in Acute Infections 473

The Decline of Venereal Disease in Denmark 473

MODERN TECHNIQUE IN TREATMENT.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXXIV.—The Treatment of Anæsthetic Sickness. By J. BLOMFIELD, M.D. 474

SPECIAL ARTICLES.

Cancer: Memorandum of Departmental Committee of Ministry of Health .. 479

Notes from India: Women's Medical Education: New Madras School.—Famine Code Revision 475

Berlin: Prophylaxis of Measles.—Medical Men and the Profiteering Act.—Threatened Strike of Club Doctors 476

Ireland: The Elections.—Food Prices in Dublin.—Increase of Admissions at a Mental Hospital .. 478

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force.—Indian Medical Service 478

PUBLIC HEALTH SERVICES

Reports of Medical Officers of Health: Chelsea.—Deptford.—Fulham.—Hampstead.—Kensington.—Paddington.—Poplar.—St. Marylebone.—St. Pancras.—Southwark.—Westminster ... 481

CORRESPONDENCE.

Ophthalmological Training for Medical Students (Dr. Ernest Thomson).. 484

The Imperial Cancer Research Campaign and the Cancer Problem (Maj. Leonard Molloy, M.P.) 484

X Rays in Exophthalmic Goitre (Mr. A. J. Walton) 484

Scholarship in Medicine (Dr. Richard Gillbard).. 484

A National Pathological Museum (Mr. J. Jackson Clarke) 484

Differential Diagnosis of Small-pox and Chicken-pox (Dr. J. W. Tomb).. 485

Spasm of the Larynx (Sir James Dundas-Grant).. 485

A Defence of the Foramen of Magendie (Prof. F. Wood Jones) 486

Heart Disease in Early Life (Dr. G. Arbour Stephens) 486

Rest and Exercise in the Treatment of Pulmonary Tuberculosis (Dr. W. E. Waller) 486

Pensions in the Indian Medical Service 486

Factory Girls' Country Holiday Fund 492

Medical Account-Keeping Simplified (Dr. W. W. Hardwicke) 492

MEDICAL NEWS.

Society of Apothecaries of London 487

Conjoint Board R.C.S.Eng., R.C.P. Lond.: Admission to Final Examination 487

Royal College of Physicians of Edinburgh: Parkin Prize 487

Faculté de Médecine de Paris 452

Sussex Provident Scheme. 463

Registration of Health Visitors in Scotland 478

Alexandra Day at Brighton and Hove 486

University College Hospital 487

Fellowship of Medicine and Post-Graduate Medical Association 487

St. Mary's Hospital 487

Museum of the Royal College of Surgeons of England 487

St. John's Hospital for Diseases of the Skin 487

London Medical Exhibition 487

Cancer Research in Manchester 487

Laura Spelman Rockefeller Memorial 487

Donations and Bequests.. 488

Royal Medical Benevolent Fund 488

Langho Epileptic Colony.. 489

NOTES, COMMENTS, AND ABSTRACTS.

Public Health in Bengal.. 489

Voyage d'Etudes Médicales 491

Convalescent Care on a Large Scale: The Work of the Burke Foundation, New York State 491

Ripening and Rotting of Hard Fruit 492

Medical Diary 488

Appointments 488

Vacancies 488

Births, Marriages, Deaths 489

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Hunterian Lecture

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ON

CHRONIC MASTITIS.

Delivered at the Royal College of Surgeons of England on May 9th, 1923,

BY GEOFFREY KEYNES, M.D. CAMB., F.R.C.S. ENG.,

CHIEF ASSISTANT, SURGICAL PROFESSORIAL UNIT, ST. BARTHOLOMEW'S HOSPITAL, LONDON.

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THE pathological problem underlying the clinical condition known as chronic mastitis is ever present in the practice of surgery; yet the current ideas concerning it are usually vague, and often, I believe, erroneous. It is known to be an exceedingly common condition, though only those patients present themselves for treatment who suffer from the more extreme degrees of it, so that it is certainly even commoner than ordinary clinical experience would suggest. Many women through long habituation come to regard a certain degree of pain in their breasts as a normal state of affairs, and consequently never seek advice concerning it. To those who do come to the surgeon the treatment is often unsatisfactory, for the local application of a belladonna plaster and advice as to wearing a support can only be regarded as palliatives of doubtful value.

The condition is most often seen in women nearing the menopause, that is to say, between the ages of 40 and 50 years. The patient complains of an aching or dragging sensation in one or both breasts; sometimes there are pricking pains at different points in the breast, and nearly always there is an increase in the symptoms at the menstrual periods. Sometimes she will state that there is an intermittent discharge of fluid from the nipple, but usually this is not noticed. On palpation the breast is found to be tender, especially at certain points, and if the patient be stout this is often all that can be made out. If the patient be thin the breast substance is found to have a characteristic ropy feeling, and the gland may be diffusely enlarged. Usually no definite tumour can be felt, but the breast substance is found to be studded with small raised points, and some of these knobs may be the centres of tender spots. Often the axillary lymph glands are also found to be somewhat enlarged and tender, though they remain soft in consistency, unlike the lymph glands associated with carcinoma. The pain, tenderness, and glandular enlargement all suggest that the breast is the seat of an inflammatory lesion, and this interpretation is implied by the name given to it; but there is no demonstrable connexion between chronic and acute mastitis. The suppurative lesion is almost restricted to the period of lactation, whereas the chronic condition occurs at all ages, and is perhaps commonest in women who have never borne children. Clinical observation affords no help in distinguishing between the interstitial and parenchymatous varieties described in books, nor are any of the ordinary clinical signs of bacterial infection to be found. The condition is not dangerous to life, and usually does not amount to more than discomfort in the sufferer. A woman who complains that her life is made miserable by it is apt to be classed as neurasthenic, and palliative treatment is given to the others.

But if chronic mastitis be not bacterial in origin, what is it? If it is an insidious change taking place independently of any acute infection in the breast, when and where are its obscure beginnings? What are the exact changes to be seen under the microscope, and what is their relative importance? If a true understanding of the condition is not of great intrinsic importance, may it perhaps have some bearing on the vastly important question of the cause and prevention of cancer of the breast? These are some of the pathological problems that present themselves.

PLAN OF THE PRESENT INVESTIGATION.

The investigation of chronic mastitis which I have recently attempted was undertaken at the suggestion of Prof. G. E. Gask, and was carried out in the laboratories attached to the Surgical Professorial Unit at St. Bartholomew's Hospital. It was proposed that a mammary gland should be removed from every female patient that came into the post-mortem room at the hospital during a given period, and that it should be submitted to a careful macroscopic and microscopic examination. It was hoped that some information would thus be obtained concerning the early stages of pathological changes in the breast and as to the average age at which they become apparent. It was felt, too, that the investigation would also help to establish, at any rate in our own minds, a clear idea of the detailed histology of the condition. The material obtained from this source has provided the bulk of the results which are recorded here. At the same time I have tried to investigate three other series of specimens: firstly, some male mammary glands collected at random in the post-mortem room; secondly, material removed from female patients operated upon for the grosser degrees of clinical chronic mastitis; thirdly, mammary glands removed for carcinoma. Clearly the post-mortem room material would afford no cultural information as to the bacterial origin of the disease, but would be entirely histological in its bearings. On the other hand, the material obtained at operation would afford histological evidence of the later stages of the disease and could be tested bacteriologically. The pathological material thus obtained has been hardened in 10 per cent. formalin. Each breast has then been cut into serial slices, carefully examined with the naked eye, and portions have been selected for microscopic examination. Lastly, I have had under observation as out-patients a certain number of women in whom chronic mastitis had been diagnosed, but not of a degree requiring operation.

HISTOLOGICAL STRUCTURE OF THE NORMAL BREAST.

At the outset of any investigation of this kind it is obviously necessary to have a clear conception of the histological structure of the normal organ, but with the mammary gland this is not so simple a matter as might be supposed. Changes, presumably pathological, proved to be so common that an absolutely normal adult organ was difficult to find. Also the gland is subjected to so many violent physiological changes that a great many different aspects are regarded as normal. An attempt, however, will be made briefly to describe the normal with regard to the life-history of the individual.

The mammary gland, developed early in fœtal life from modified sweat glands, is at birth much the same in either sex. Of true glandular tissue there is little or none, the organ consisting of simple ducts, between 12 and 20 in number, converging to the nipple. These ducts are surrounded by a matrix of fibrous connective tissue, which forms for the breast throughout its career a stable, supporting framework. In this condition it remains through most of the years of childhood. As puberty makes itself felt, the breast is awakened to greater activity. The ducts begin to throw out lateral branches, which in turn subdivide again and again, and in this way a racemose gland is formed possessing an enormous number of small terminal acini. Meanwhile, as the branches grow, the connective-tissue matrix undergoes a corresponding increase in bulk, so that the glandular tissue is not as a rule to be found encroaching on the cellular tissues in the neighbourhood. This connective tissue is largely responsible for the increase in size at this period.

* This Lecture appears in an extended form in the British Journal of Surgery, July, 1923.

The epithelial lining of the mammary gland consists throughout of one layer of epithelial cells, beneath which is a layer of smaller, more or less flattened, supporting cells. In the main ducts the cells of the glandular layer are columnar or cylindrical in shape, and these give way, as the ducts branch, to cells which are more definitely cubical. The transition from columnar to cubical is not abrupt but very gradual, and it is difficult, or impossible, to say where duct ends and acinus, or true secretory tissue, begins. The truth is, I believe, that all the cells participate in the secretion, and the difference lies rather in the chemical composition of the secretion than in their morphology. Even in the immature breast, which contains only the large collecting ducts, these ducts are filled with a fluid secretion.

Several modifications in shape are seen in a duct as it passes from the surface of the nipple to the interior of the breast. These changes appear to me to be of great, though imperfectly appreciated, importance in the pathology of the diseases of the breast. I wish to draw particular attention to the manner in which the ducts open on the surface of the nipple. In the accompanying drawing (Fig. 1 on Plate) it will be seen that the actual mouth of the duct is a funnel-shaped structure lined with ordinary squamous epithelium. These squamous cells extend for a considerable distance below the surface of the nipple, and in the inactive breast the point at which they end—that is, at the neck of the funnel—the lumen of the duct becomes extremely narrow and is usually almost obliterated. Immediately beyond this point there is an abrupt transition from squamous to columnar epithelium, and at the same time the duct suddenly opens out, the lumen becoming wider than at any other part of its course. This part forms the ampulla of anatomical nomenclature. The walls of the ampulla, unless it be greatly distended with secretion, are irregularly folded, and so it can adapt itself to wide variations in content.

A further point which I wish to emphasise is the fact that the funnel-shaped mouth of the duct is lined with an epithelium which normally keratinises on the surface. These keratinised layers inevitably tend to accumulate in the depression formed by the funnel, and I have found that in the non-lactating breast the mouths of the ducts are, almost without exception, filled by a laminated plug of keratinised epithelium. I have examined a very large number of nipples, both by making longitudinal sections and by serial transverse sections. In a longitudinal section the plug can be seen to form a cone-shaped cast of the mouth of the duct. In a transverse section (Fig. 2 on Plate) the laminated plug is well seen. As soon as the narrow neck of the funnel has been passed the plug disappears and the duct opens out again, as has already been said. The mouth of the duct in a lactating breast forms a striking contrast to this. The narrow neck is now widely open, and the epithelial plug, except for a few layers at the periphery, has disappeared. Sections of the nipple also show the large amount of unstriped muscle tissue, disposed rather irregularly in small bundles, which this structure contains. The contraction of this muscle is presumably largely responsible for the narrow neck of the funnel. In any case it is clear that no secretion present in the ampullæ of a non-lactating breast is normally allowed to escape. The duct therefore becomes additionally sealed by a firm epithelial plug. This may be accentuated by the retraction or deformity of the nipples which is often found to be associated with chronic mastitis, and is by no means to be regarded as a sign diagnostic of carcinoma.

NORMAL PHYSIOLOGY OF THE BREAST.

It may seem at first somewhat superfluous to devote a special section of a paper on the pathology of an organ to a consideration of its normal physiology; but in the case of the breast I believe the latter to be to a large extent the key to its pathology. I have hitherto spoken of the breast as a gland either inactive or functioning—that is, lactating; but I now wish to put forward the view that the breast is a gland which throughout life is exhibiting some secretory activity, the difference between a lactating and a non-lactating breast being one partly of degree and partly of the chemical constitution of the secretion.

The physiological history of the mammary gland begins at birth, when there is often an abortive attempt to fulfil its ultimate function of lactation. This may be called clinically an "infancy mastitis," and is presumably to be explained by the fact that both fœtal and maternal breasts are subjected to the same hormonic stimulus. I have no knowledge of the histological appearance in such a case, but I do know that in many of the sections of breasts of young children that I have seen, the ducts are considerably distended with secretion, which may be taken as evidence that the cells of the immature gland have some functional activity. The clinical condition of mastitis is not, however, often seen in children between infancy and the age of 11 or 12, but from this time onwards the physiology of the breast is very intimately connected with that of the sexual glands. After the age of 11 in girls and 13 in boys the condition of "puberty mastitis" is very commonly seen. There is a painful swelling of one or both breasts, which, though not acute, may persist in boys for two or three years and then disappear. In girls it passes into the phase of normal hypertrophy which attends the attainment of sexual maturity.

In girls, with the arrival of sexual maturity the mammary glands enter upon a phase of permanent semi-activity, and are subjected to a constantly recurring physiological stimulation which is repeated in varying degrees at frequent intervals for a period of at least 36 years. At every menstrual period the glands are acted upon by hormones from the sexual glands, which awaken some sort of activity in the epithelial cells. In many women this may pass unnoticed. Many others are painfully conscious of the process and may be led to consult a doctor about it, who will perhaps make a diagnosis of "chronic mastitis." The condition should perhaps rather be called at first "menstrual mastitis," though as time goes on the physiological state becomes more and more difficult to distinguish from the pathological. In the event of pregnancy becoming established, the menstrual cycle is for the time being abolished, and a different form of hormonic stimulation is substituted. In response to this the cells enter upon their full functional activity, and a period of enormous hypertrophy, culminating in lactation, follows. Lactation is succeeded by a process of shrinkage, during which the cells of the hyperplastic gland largely disappear and are absorbed—unless further pregnancies follow in quick succession, in which case the gland may be almost continuously active for several years.

At about the age of 48 the possibility of further pregnancies comes to an end, but the phase of the climacteric may subject the mammary glands to a series of irregular hormonic stimuli, which only cease with the final establishment of the menopause. Then, and then only, are these glands allowed to rest, and I believe that in strict normality an almost complete atrophy of glandular tissue gradually takes place. First the acini disappear, then the small ducts, and finally only the largest collecting ducts remain. Even in these the cells are small, and the lumen greatly shrunken. The connective-tissue framework may also become reduced in bulk, though the external appearance of the breast would often belie this owing to its becoming infiltrated with fat. After the menopause, therefore, and in old age, there is no true physiology of the breast to record, but too often a physiological process has become merged in a pathological condition, which probably has had its origin many years before. A physiological stimulus may amount to a pathological insult if only it is repeated often enough. It may be asked why I have chosen to dwell in such detail upon a series of physiological commonplaces. My object has been to emphasise the fact that the epithelial cells of the breast are producing some sort of secretion

almost continuously for many years. I have already demonstrated that, except during lactation, the mouths of the ducts are not normally patent, and that no secretion can escape. The physiology of the breast entails, therefore, not merely secretory, but also continuous absorptive, activity. I shall return later to the bearing of this upon the pathology of chronic mastitis.

HISTOLOGICAL EVIDENCE OF MASTITIS.

I now turn to a description of the histological changes which I believe to be indicative of the presence of chronic mastitis. I can but describe each one in turn; it must be understood, however, that all may be seen at once in one small area, though as a rule their relative distribution in the breast is very erratic. If, as the name of the disease implies, it is an inflammatory condition, then it would be expected that one of the cardinal signs of inflammation, infiltration of the connective tissues with leucocytes, would invariably be present. Actually, the presence of round cells is not an invariable sign, or, at any rate, all parts of the diseased breast are not equally affected.

It is, however, evident that the round-celled reaction is more intense when the lumen of the acini or ducts that they surround is filled with a fluid rich in disintegrating cells or fat-containing secretion. The mere presence of epithelial changes certainly does not on the whole tend to determine a concentration of leucocytes. It is the presence of dead cells or inspissated secretion which attracts them most strongly. The microscopic appearances suggesting *inflammation* are therefore indirectly produced by interference with the escape of the products of epithelial activity from ducts and acini. The most extreme condition of leucocytic infiltration that I have found was in the breast of a woman who became pregnant after having developed an advanced chronic mastitis. The breast attempted to lactate, but the secretion was unable to escape normally, and re-absorption of the milk was only effected with an intense inflammatory reaction. A similar condition, which may be called a "stagnation mastitis," is seen clinically in a woman who has for some reason been compelled to cease suckling her child soon after its birth. Re-absorption of secretion is then attended by acute pain and inflammation, which may initiate a chronic mastitis and give rise to considerable suffering in a subsequent pregnancy. It is important to note what type of cell is most commonly found, and it is clear that the lymphocyte nearly always predominates. In the extreme case mentioned there were also a good many polymorphonuclear cells, and in another there were large numbers of eosinophil cells producing a very unusual appearance.

The presence of fibrosis is another change seen in the interstitial tissues which is very capricious in its distribution. Often the first evidence of true fibrosis is seen as an increase in the density of the layer of fibrous cells immediately outside the ducts or acini. In sections stained with eosin this is seen as a conspicuous red rim round these structures, consisting of several layers of connective-tissue cells. In another form of fibrosis the area of loose and transparent connective tissue round the groups of acini tends to become contracted or to disappear altogether. The eosin staining then extends evenly right up to the acini. In a later stage the epithelial cells may disappear and be replaced entirely by fibrous tissue arranged as a group of small whorls, each whorl presumably representing an acinus. This appearance tends to resemble the arrangement of fibrous tissue seen in a fibro-adenoma intracanaliculare, and that, after all, is probably the late stage of an originally glandular tumour in which the fibrous tissue has become predominant at the expense of the epithelial cells.

Dilatation of ducts and acini is a change that almost always accompanies chronic mastitis, but it is difficult to judge at what point the process is to be regarded as pathological. For it is quite normal to find a dilatation of the large collecting ducts and ampullæ which can be seen with the naked eye when the breast is sliced, and this is only to be expected in a secreting gland which has no outlet except when lactating. As the secretion accumulates, this distension may be communicated to the smaller ducts and finally to the acini, which normally have only a very small lumen; but clearly there is no criterion indicating definitely the point at which the process becomes pathological. I have therefore not been able to use any particular standard. Each section has been judged on its merits. The formation of small cysts which can be felt with the fingers is characteristic of chronic mastitis, but this is only a more advanced stage of a change which can at first only be appreciated under the microscope. The presence of large cysts lined by flattened epithelium and filled with a clear greenish fluid, a turbid milky fluid, or a cheesy mass is also characteristic of a still later stage of mastitis. These advanced changes are presumably associated with obstruction to a duct by fibrosis, cellular proliferation, or pressure; but I have not been able to demonstrate this in relation to any particular cyst.

The epithelial changes in chronic mastitis are more definite and more easily identified than those described so far. The changes appear to me to be of two different types. In one type the change is primarily an enlargement or swelling of the cells without very much active proliferation; in the other the cells do not always undergo any alteration in size, but simply proliferate in varying degrees, forming either the "laciform proliferation," so named by Sir Lenthal Cheatle, or "massive proliferation," solid lumps or columns of cells filling and distending the spaces originally occupied by the acini or ducts in which the process arises. The first change may be partly degenerative, but it is not connected with the so-called "involution changes" seen in the breasts of women who have passed the menopause, for I have found it at all ages from 16 upwards. Nor do the cells show any fatty changes in their cytoplasm when tested with the special fat stains. It seems, on the other hand, to be associated with some form of irritation, and may occur in patches (Fig. 3 on Plate). In most instances the change seems to spread and involve the glandular tissue of neighbouring groups.

The second type of cellular change is, as I have said, primarily a proliferative change, and clearly indicates a much greater activity in the cells. Often, as proliferation proceeds, some of the cells are cast off and disintegrate. When these have disappeared a "laciform" appearance will presumably result. This is not in any essential particular different from the massive proliferation seen in Fig. 4 (on Plate), where the outlines of a few acini can still be made out.

Another change which seems to be closely associated with the cellular changes already described takes place chiefly in the larger ducts, and results in the formation of true papillomata. The first stage of this is shown in Fig. 5 (on Plate), where the wall of a distended duct is seen to be sprouting small excrescences all round its circumference. Such papillomata are commonly found in the ducts close to the nipple and their presence often gives rise to a clear or blood-stained discharge from the nipple, and this usually attracts the patient's attention. But I do not believe that such a papilloma ever occurs as an isolated phenomenon. The signs of chronic mastitis would certainly be found in other parts of the breast if search were made for it.

Summarised in as few words as possible the histological changes seen in chronic mastitis are: round-celled infiltration, fibrosis, dilatation, epithelial changes of two kinds, and formation of papillomata. In the early stages of the disease some degree of fibrosis, as described here, some degree of dilatation of the small ducts or acini, and a few patches of round cells are the chief histological evidences of its presence. In the later stages all these changes become accentuated and are associated with one or both of the forms of epithelial change. Sometimes the leucocytic activity

appears not to be accentuated at this stage, but may, on the other hand, be almost absent. In the stage at which operation is performed the slight dilatation has usually culminated in the formation of large cysts, but at this point the condition is given a number of different names indicating supposedly distinct diseases. The laciform or massive proliferation clearly indicates that a profoundly abnormal activity has been somehow induced in the epithelial cells, and this may be of the greatest importance in considering the question of malignancy. This will be discussed later.

AGE- AND SEX-INCIDENCE OF PATHOLOGICAL CHANGES IN THE BREAST.

One object of this investigation was to ascertain, if possible, at about what age the changes of chronic mastitis first become apparent. It is difficult, however, to obtain accurate facts from statistics based on the relatively small numbers to which I was necessarily limited. The post-mortem room material provided 116 specimens, of which 57 were normal and 59 showed inflammatory lesions. In the accompanying chart is shown the percentage, in every decade, of

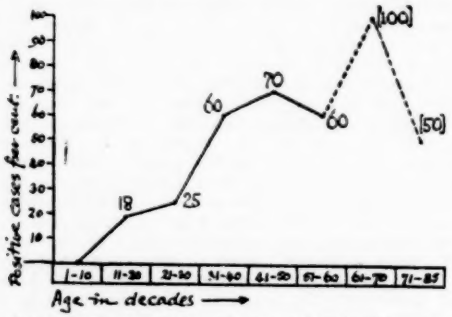

Chart showing percentage in every decade of persons having positive signs of chronic mastitis.

individuals having positive signs of chronic mastitis. It will be seen that the lesions first become apparent in the second decade, and rise to a maximum in women aged 40 to 50. It is, of course, possible that the figure of 18 per cent. in the second decade would be lower if I had more material on which to base it. Also I feel quite sure that the extreme irregularities seen in the graph after the age of 60 are quite misleading, the number of cases beyond this age that were investigated being very small. I have therefore shown this part only in dotted lines. It is evident from this diagram that chronic mastitis is not a disease of the climacteric only, as has sometimes been supposed. It may have had its beginnings 30 years before this, though it is most apt to become clinically obvious at the later age.

Post-mortem room material also gives some indication of the influence of lactation upon the incidence of chronic mastitis. Details of family history had not been recorded in all cases, but the figures as far as they could be ascertained were as follows:—

Post-Mortem Room Material.

Average age of all positive cases	unmarried or childless	43 years.
	parous women	51 ,,

A similar impression is obtained from the series of cases which had developed manifestations of mastitis necessitating operation. The youngest unmarried patient in this series was 24. The youngest married patient was 46. The average ages were as follows:—

Operation Material.

Average age of	unmarried patients	37 years.
,, ,,	married patients	46 ,,

It seems to be clear that chronic mastitis tends to appear nearly *ten years* earlier in single women than in those who have borne children.

I have so far referred only to the incidence of chronic mastitis in the female sex. It is well known, however, that males may suffer from all the same affections of the mammary glands as females, though very much less commonly. The early physiological types of inflammation in the breast—namely, infancy and puberty mastitis—occur almost as often in boys as in girls. Afterwards the breast in the male becomes quiescent. In later life, however, men may develop in their breasts all the same conditions as are seen in women. Ordinary chronic mastitis is not very rare in old men. Sometimes cysts, papillomata, and so forth are developed, and may necessitate operation. A definite percentage of cases of carcinoma of the breast is found in men. I thought it worth while, therefore, to examine a series of male breasts from the post-mortem room, in order to find out how often the changes of chronic mastitis were to be found. I have examined 37 specimens, and found some changes in four of them. In one of these, from a man of 38, the picture was that of a well-developed chronic mastitis. Some of the ducts were enormously dilated, and the secretion contained large numbers of cells. In some places there was swelling and desquamation of the epithelial cells, and there were numerous patches of round-celled infiltration. The average age of the four patients was 54. It was noticeable that almost every specimen showed that the ducts had a wide lumen and contained secretion, so that the conditions very closely resemble those found in women. It must be remembered, however, that the gland tissue in the male is represented only by the largest collecting ducts. In the female breast the changes of mastitis are seldom seen in these large ducts, but are almost always in the smaller ducts or acini, which do not exist in the male. It may be, therefore, that the epithelium of the large ducts is for some reason less vulnerable, and so less liable to pathological changes, than that of the more truly glandular tissue. Perhaps it is partly to this that the male breast owes its comparative immunity from disease. It is also less subject to irregular hormonic stimuli.

THEORIES OF CAUSATION.

As indicated at the beginning of this paper, the idea of the causation of chronic mastitis that has commonly held the field is one involving the presence of some obscure bacterial infection. I cannot, however, discover any evidence in favour of the view that the inflammation is bacterial. All that I can gather seems to show that bacteria take no share in the disease.

I have shown, I believe conclusively, that the normal breast has, except during lactation, no outlet through the nipple. The mouths of the ducts are mechanically closed a little way below the surface by muscular contraction which reduces the lumen almost to nothing. They are in addition sealed by a firm plug of epithelium, reinforced by sebaceous secretion, a substance which is known to be unfavourable to the growth of bacteria. It seems very unlikely, therefore, that any foreign substance could obtain entrance through the nipple. It cannot be claimed that lactation affords an opportunity for infection from without, since the changes of chronic mastitis are so often found in breasts which have never lactated. There is the alternative supposition that bacteria may have been brought to the breast by the blood-stream. In the case of a tuberculous infection this undoubtedly happens, and presumably a pyogenic infection may occasionally occur in the breast in the course of a blood infection, as may happen in any other part of the body; but it is difficult to believe that every one of the vast number of women afflicted with chronic mastitis has pyogenic bacteria circulating in her blood in numbers large enough to produce a diffuse lesion in both breasts.

In either case it should be possible to recover these bacteria from a breast showing a well-marked degree of mastitis; but this I have invariably failed to do. Also the histological appearances do not suggest the presence of bacteria. Bacterial infection is almost invariably accompanied by a leucocytic reaction. This, as has been said, is often absent in chronic mastitis. Also the leucocyte characteristic of pyogenic

infection is the polymorphonuclear cell. In chronic mastitis it is always the lymphocyte which is present, almost to the exclusion of polymorphonuclear leucocytes. Nothing can be inferred from the presence in one case of large numbers of eosinophil leucocytes.

I have mentioned that enlargement of the axillary lymph glands is often associated with chronic mastitis, but this cannot be interpreted as necessarily indicating bacterial infection. Absorption of any toxic products, bacterial or non-bacterial, may produce signs of lymphadenitis in the glands draining the affected area. It seems reasonable, therefore, to reject the bacterial theory of causation on the ground that there is no evidence to support it. Another theory which has been advanced suggests that chronic mastitis may be caused by a general toxæmia, the source of the toxin being a site of bacterial activity in some part of the body. Thus it was observed by C. B. Lockwood[1] many years ago that the symptoms of an inflammatory tumour in the breast disappeared after the removal of a source of infection, such as an infective vaginitis. More recently, affections of the mammary gland have been connected with intestinal toxæmia by W. S. Bainbridge.[2] But judgment as to the possible connexion between chronic mastitis and chronic toxæmia must be suspended until more precise evidence than is given by these authors is forthcoming. Another condition which has been held by many writers to be responsible for chronic mastitis is one that is termed "involution change"; but after lactation this change is probably passive in most respects, and according to the most recent view[3] results partly from a lessened blood-supply, and partly from the pressure produced by the secretion which is no longer removed as it is formed. This effect may be aided by bandaging. Under these conditions the epithelial cells undergo autolysis or self-digestion, the products of this metabolism being then removed by way of the lymph- or blood-stream. In this way the hypertrophied organ is removed piecemeal in a relatively short time, until nothing but the ducts with their normal proportion of branches and acini remain. It is difficult to see how any abnormal cellular processes could be initiated in this manner. It is often stated also that involution changes take place at the menopause, and this statement is associated with the quite erroneous dictum that chronic mastitis is "a disease of the climacteric." It is true that the symptoms of the disease are clinically most obvious at that time, because the cause of the mastitis, whatever it may be, has by then been in operation for a number of years, and also because the breast is at that time being subjected to very irregular hormonic stimuli. The disease must in all cases have begun many years before this, and I see no justification whatever for supposing that the "involution changes" attending the menopause have any connexion with the disease. Moreover, these so-called involution changes are, as I have so often seen them under the microscope, usually nothing more than a simple atrophy. In a breast which has not developed any marked degree of chronic mastitis with cyst formation or abnormal epithelial activity, the acini become smaller and smaller, the lesser ducts tend almost to lose their lumen, and finally most of the glandular lobules disappear altogether. The large ducts always remain, and usually contain secretion; but, except for these, a normal senile breast consists almost exclusively of fibrous connective tissue, which in stout subjects becomes infiltrated with large quantities of fat. There does not seem, therefore, to be much evidence in favour of the involution theory of chronic mastitis, and I think it should be abandoned.

Finally, it has been suggested that trauma may have some influence in initiating a chronic mastitis. I have shown, however, that the changes seen in this disease are diffuse, and clinical experience teaches that the condition is very often bilateral. It is, further, difficult to suppose that any woman could pass 40 years of her existence without being subjected to the ordinary accidents of everyday life, so that a history of trauma can always be obtained by questioning closely enough. Trauma is, in fact, so vague a factor that I do not think it need be further considered.

CAUSE OF MASTITIS TO BE FOUND IN PHYSIOLOGICAL PROCESSES IN THE BREAST.

My consideration of the possible causes of chronic mastitis has been so far purely destructive. I now wish to offer a constructive solution of the problem, which is, however, not yet susceptible of proof. Causes outside the breast do not seem to offer any real help. May there be then any cause within the breast itself? I think the answer to this question is that there may indeed be a cause within the breast, arising in the first place from an inherent defect in its anatomical construction, which reacts in its turn upon the normal physiological mechanisms. It has already been demonstrated that the non-lactating breast is an organ which is subjected to continual physiological stimuli, but which has no outlet for the products of its own activity. A re-absorption of secretion must, therefore, continually be taking place. In addition to this the epithelial lining of both ducts and acini is being constantly renewed and effete cells are being cast off into their lumen. These cells disintegrate and must somehow be removed unless the breast is to become a stagnating mass of epithelial débris. All the available evidence seems to me to point to the fact that the breast is itself continually pouring into the lumen of its ducts and acini a possible source of irritation to which all the pathological changes that I have reviewed may be attributed. Should there be a partial failure in the process of re-absorption of fluid and scavenging of epithelial débris, then any such irritation will become accentuated. This in its turn will further interfere with absorption and may initiate abnormal cellular activity, and so a vicious circle will become established.

I do not pretend to be able to suggest exactly what factors in the body may disturb the physiological balance of secretion and re-absorption. In some individuals the balance may be maintained throughout life. In others—probably the majority—it is upset after being successfully maintained for a considerable number of years; even then there are very wide variations in the degree of irritation produced, and this variation occurs not only as between individuals but also in different parts of the same breast. The variation may be both in the concentration of the irritants formed in the secretions and in the susceptibility of the cells exposed to its action. The reaction of one individual may lie chiefly in the direction of fibrosis; in another it may produce the various forms of abnormal epithelial activity which have already been illustrated. In one case the results of irritation may become apparent after it has been acting for a relatively short time; in another it may be 30 or 40 years before any pathological change can be appreciated. But whatever the source of irritation may be, it is clear that the time factor is of great importance. It has been very commonly observed that an advanced degree of chronic mastitis is seen at an earlier age in women who have never borne children than in women who have passed through the healthful process of pregnancy and lactation, and this is confirmed by the figures already recorded. The explanation of this is to be found in the fact that during lactation the mouths of the mammary glands become unsealed, and the products of activity are removed. If a woman has a large family of children, this natural drainage is established with intermissions for a period of many years, and only as middle age approaches do the breasts again begin to feed upon themselves. For this reason chronic mastitis has been called a disease of the climacteric; but the condition really had its first beginnings when lactation ceased for the last time, perhaps ten years before.

It is worth remarking that recent investigation of the functions of the lymphocyte, the cell so characteristic of chronic mastitis, tends to confirm indirectly this interpretation of the source of irritation in the breast. The lymphocytes in chronic mastitis are, as

has been said, very erratic in their distribution, but they are in maximum concentration in a lactating breast when there is any interference with the free escape of milk, and apart from lactation tend to be most numerous in relation to ducts or acini containing much cell débris or fatty secretion. This gains significance from the conclusion arrived at by Dr. S. Bergel,[4] that lymphocytes contain a lipase and are concerned in the digestion of fat and lecithin bodies both in physiological and pathological conditions. The presence and distribution of lymphocytes in the breast thus finds a natural explanation.

THE CHEMICAL PROBLEM.

This explanation of the cause of chronic mastitis in the human being is based entirely on deductive reasoning; but a little thought will show that the hypothesis fits in with all the observed facts both clinical and histological. It cannot, however, be finally accepted until the factor actually responsible for producing a state of irritation has been determined. This introduces an exceedingly difficult problem in biochemistry which can only be dealt with by those who have been specially trained in this line of investigation, and so far as I know little has been done as yet in this direction. It can easily be demonstrated that there are wide variations in the composition of the fluid which is contained in cysts of the breast, or can be expressed from the cut surface of the gland. Commonly a clear green fluid is obtained; sometimes it is brown. Sometimes the fluid is turbid with cell débris; sometimes it is milky and contains both cell débris and fat globules. Occasionally the contents of the ducts or of a cyst are cheesy or almost solid in consistency. This material may consist chiefly of enormous numbers of cast-off cells. Occasionally it may be composed almost entirely of fat, and is probably derived from inspissated milk. A cyst of this nature is known as a galactocele, and is likely to arise in a breast which has attempted to lactate in the presence of a mastitis already well established or of a carcinoma, either condition causing an obstruction of one or more ducts.

The chemical changes which may take place in these stagnating fluids are, as has been said, more or less unknown; but I feel sure that much will be learnt from the investigation of the chemistry of the secretions and of their effect upon the living cells that are exposed for a longer or a shorter time to their influence. Attention has several times been drawn to the analogy between the changes that are found in middle age in the breast and in the prostate,[5] and it is quite possible that chronic mastitis and senile hypertrophy of the prostate are dependent upon similar factors. Light may also be thrown upon abnormal epithelial growth in other organs.

RELATION OF MASTITIS TO CARCINOMA OF THE BREAST.

An immense body of literature has been devoted to the discussion of the relation between chronic mastitis and carcinoma of the breast. This seems to begin with the statement made by Billroth[6] in 1880 that "cancer does not develop in an otherwise normal breast," and culminates in the evidence published by McCarty[7] in 1915. The changes of chronic mastitis were present in every one of 967 cancerous breasts investigated by him. The opinions of many other writers tend in the same direction, and it is, indeed, an almost universally accepted idea that carcinoma of the breast is preceded by the epithelial changes of chronic mastitis. Sir Lenthal Cheatle[8] in several valuable contributions has recently tried to demonstrate this passage from innocent to malignant proliferation, and has even been so bold as to class under the heading of "the premial breast" a mammary gland which shows the epithelial changes previously described. But the coexistence of innocent and malignant proliferation does not prove that one necessarily precedes the other. However probable the occurrence of a "precancerous" condition in chronic mastitis may appear, it is exceedingly difficult to furnish any scientific proof of the change, and this has certainly not yet been done.

It has already been mentioned that a great many writers have recorded their observations on the occurrence of chronic mastitis in cancerous breasts, and that McCarty found the association in every one of 967 breasts. It may, in the face of this, seem futile to refer to my own observations, which have been made on only 25 specimens. But even in this short series I have been struck with one or two facts. In these 25 breasts I have found some evidence of chronic mastitis at a distance from the carcinoma in 20, that is 80 per cent. Of the remaining five, three had been infiltrated throughout with the carcinoma, and one was, in addition, lactating, so that it was not possible to form any opinion as to whether chronic mastitis had been associated with the carcinoma or not. It seems to me very extraordinary that this same difficulty should not have occurred in McCarty's series of 967 specimens. The remaining two specimens of my series showed only a senile atrophy in the outlying parts of the breast. I was not therefore able to confirm the 100 per cent. results of some observers.

Another singular fact that forced itself on my attention was that in most cases the breast tissue showed a great increase in epithelial activity close to the advancing edge of the carcinoma, but that this was progressively less, the greater the distance from the malignant infiltration. This proliferation, which resembles that seen in the proliferative type of chronic mastitis, looked as if it were in some way connected with the growth of the carcinoma in close proximity. The well-marked degree of infiltration with lymphocytes usually seen at the growing edge of the carcinoma indicated an inflammatory reaction, and strongly suggested that the malignant cell might be influencing other cells at a distance by means of an abnormal and irritating secretion which induced a cellular proliferation similar to that resulting, as I have suggested, from long exposure to secretions in chronic mastitis, though acting very much more rapidly. If this suggestion were to be substantiated it would explain the apparent association of chronic mastitis with carcinoma in so large a proportion of cases; but it would in no way demonstrate that chronic mastitis is a "precancerous" condition. I cannot offer an opinion that would carry any weight as to the precise relation of chronic mastitis to carcinoma. I can only make the suggestion that carcinoma is not necessarily preceded by chronic mastitis, but that both conditions, or either separately, may result from one cause—namely, prolonged exposure to a chemical irritant such as may be present in the stagnating secretions of the breast.

TREATMENT OF CHRONIC MASTITIS.

In considering the treatment of chronic mastitis I shall not enlarge upon the operative methods of dealing with the more advanced stages of the disease. It is clear that in the present state of knowledge it is wisest to deal radically with the fully-developed type of chronic mastitis with cysts. Complete removal of the gland is sometimes necessary, though it may be remembered that, if there is no reason to suspect the presence of a carcinoma, there is no necessity for removing much, or even any, skin, and that a subareolar operation may be carried out without fear of recurrence. This may still be done even though the massive proliferation of epithelial cells is found to be present. If the disease is apparent as a single cyst or a localised group of cysts, then a local operation is adequate. Some diffuse change will almost certainly be present in the remainder of the breast, but it is always possible that this will not develop further and will not give rise to symptoms of any consequence. The same remark may be applied to a papilloma of a duct-ampulla or to a galactocele.

The treatment of the earlier stages of chronic mastitis in which pain and tenderness, or merely discomfort, are the chief symptoms, presents a more difficult problem. Often there is a psychological factor in the symptoms, and operation is then scarcely

ever to be advised. If the trouble is of the intermittent menstrual type, no medical treatment or local application is likely to be of any avail. This type occurs chiefly in young women, and the symptoms may subside of themselves as the patient grows older. Otherwise marriage, followed by pregnancy and lactation, will relieve the patient of her trouble. The more persistent type of chronic mastitis in older patients I have attempted to treat in the way which is logically suggested by the investigations here described. I have first freed the mouths of the ducts in the nipple and opened up their natural outlets by bathing with hot water. Manual pressure combined with a suction bell will then often produce a considerable quantity of the turbid or clear green fluid which is always present in the ducts and dilated acini. The patient is instructed to carry out this treatment systematically, and in a few cases some relief of pain and discomfort has been obtained. But the results are disappointing on the whole. This is not unnatural, for the chronic inflammation has produced fibrosis and other abnormalities in the glandular system, so that efficient drainage of every lobule is no longer possible. The treatment should not be persisted in unless improvement very soon results.

The best results seem to be obtained by the judicious application of X rays. If the proper dosage is applied by an expert, a single treatment will usually have a most satisfactory effect. By this means the secretory activity of the epithelial cells is inhibited or destroyed, and the treatment is again the logical outcome of the interpretation I have put upon the pathology of the disease. The treatment is not new, having often been used empirically in the past, but I have here attempted to put it upon a rational basis.

CONCLUSIONS.

1. The breast is a secreting gland which shows periodical activity from birth to the menopause.

2. The normal, non-lactating breast has no outlet through the nipple for the discharge of its secretions. Secretion must therefore be balanced normally by re-absorption.

3. Chronic mastitis is manifested by dilatation of ducts and acini, accumulation in them of the products of epithelial activity, infiltration with lymphocytes, fibrosis, and epithelial changes. The distribution of all these is very erratic.

4. Chronic mastitis is commonest in women, but occurs also in men. It first appears in the second decade, but is most often seen in the fifth. It appears earlier in single women than in women who have borne children.

5. Chronic mastitis is not bacterial in origin, toxæmic or traumatic, nor is it related to involution changes in the breast.

6. The cause of chronic mastitis is probably to be found in chemical irritation due to stagnating secretions and epithelial débris. This cannot be proved until the chemical changes have been investigated.

7. Chronic mastitis, though very often associated with carcinoma, has not been proved to be "precancerous." Both may be due to the same cause.

8. Chronic mastitis in its more advanced stages must be treated by operation. At an earlier stage natural drainage may be tried, or X rays may be applied.

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THE OPERATIVE TREATMENT OF VESICAL DIVERTICULA.*

BY J. SWIFT JOLY, F.R.C.S. ENG.,
SURGEON TO ST. PETER'S HOSPITAL FOR STONE; CONSULTING UROLOGIST, WANDSWORTH MUNICIPAL HOSPITAL.

(With Illustrations on Special Plate.)

THE treatment of large vesical diverticula is one of the most difficult problems that the urinary surgeon has to grapple with. Complete excision of the sac is, at present, the accepted method of dealing with it, but as so many widely divergent views have been expressed on this subject, it may be of interest to give a brief description of 14 cases upon which I have operated, and the conclusions I have drawn as to the relative values of the different methods employed.

CASE 1.—Male, aged 51, admitted to St. Peter's Hospital Jan. 11th, 1910.

History.—He always had difficulty in micturition, and took much longer to complete the act than other people. Was catheterised in 1901. His bladder was then infected. Since then he has suffered from frequent attacks of pain in the left groin, accompanied by headache, backache, night sweats, marked frequency of micturition, and occasionally by hæmaturia. Frequency of micturition from one to two hours both by day and by night. The urinary stream was slow and weak, but he never had retention of urine. Pain during micturition felt along the urethra.

Condition on Examination.—No stricture. Residual urine 13 oz. Prostate normal; above it the bladder bulged into the rectum, but was not indurated. The bladder could be felt, when it was apparently empty, rising just above the pubis, under the right rectus; when it was distended the displacement to the right was more marked. Urine: Sp. gr. 1018, acid, albumin present, no sugar, urea 1 per cent., deposit of pus and blood. Cystoscopy: Only after a long course of daily irrigation was it possible to wash the bladder clear enough to obtain a satisfactory view. Distension 24 oz. The right ureter was displaced to the right, and the left almost to the middle line. The opening of a large diverticulum was seen above and to the left of the left ureter. It was round, and appeared to be about the size of a lead pencil. Surrounding this orifice, except at its lower part, was a polypoid mass of œdematous mucous membrane. The left ureter was dilated.

Operation.—On the 19th. Trendelenburg position; median incision from pubis to umbilicus, and a transverse one across the left rectus 1½ in. above the pubis. The operation was entirely extra-peritoneal. The diverticulum was about half as large again as the bladder. It completely filled the left half of the pelvis, and extended a short distance to the right of the middle line, pushing the bladder before it. The diverticulum was separated from the surrounding tissues, until the spine of the ischium was reached. A large vein was torn here, and as it could not be picked up and tied this part of the wound was plugged with gauze. The bladder was then opened, and the orifice of the diverticulum identified. It just admitted the first finger, and was about an inch above and to the left of the left ureter. With one finger in the opening the wall of the diverticulum was divided close to the bladder. This incision was carried round the orifice, and the diverticulum was separated from the bladder. This brought the left ureter into view. It was about as thick as the finger, and curved forwards, immediately below the diverticular orifice to its entrance into the bladder. In this portion of its course it was compressed between the diverticulum and the bladder. The diverticulum was now rapidly freed from the remaining adhesions to the rectum and prostate, and removed. The bleeding-points were picked up and ligatured, the wound partially closed, and the bladder and pelvis drained.

Course of Case.—Convalescence was slow and a suprapubic fistula, which tracked down to the diverticular opening, persisted for almost three months. It then closed, but after a short time broke down again. On June 8th he was again admitted to hospital and the sinus excised; at the same time the prostate was enucleated, though it did not appear to be enlarged, as it was thought to have been the cause of the persistent sinus. After this operation the fistula remained closed. In 1913 he was again admitted to hospital and a suprapubic hernia was cured by the filigree method.

This patient eventually died in December, 1920, almost 11 years after his operation, of chronic pyelonephritis, which persisted in spite of treatment. During this interval he had practically no frequency or difficulty in micturition, but

* Read before the Section of Urology, Royal Society of Medicine.

there was always a quantity of about 3 oz. of residual urine. The diverticulum, after it was hardened, was about the size of a large orange. Its walls were one-eighth of an inch thick, and were composed of three distinct layers of muscular tissue, lined with transitional epithelium, which was much altered by inflammation (Fig. 7 on Plate).

CASE 2.—Male, aged 53, admitted to St. Peter's Hospital, March 19th, 1912.

History.—Gonorrhœa 30 years before. Developed a stricture, which was easily dilated. Passed a bougie on himself twice a year, but the second time he did so he infected his bladder. Since then had several attacks of cystitis, and his urine always remained turbid.

Condition on Admission.—Slight frequency of micturition. Stream good, some straining towards the end. Occasionally micturition à deux temps. Stricture admitted 17 F easily, and was fully dilated in two sittings. Prostate normal, but a soft elastic swelling could be felt above it. Residual urine varied from 12 to 16 oz. Urine: Sp. gr. 1018, acid, no albumin or sugar, urea 1·9 per cent., deposit pus and bladder epithelium. Cystoscopy: Slight general cystitis. Both ureters normal, clear efflux from both sides. Above the inter-ureteric bar and immediately to the left of the middle line was the opening of a large diverticulum. It was oval in shape with the long axis directed vertically. The cystoscope was introduced into the diverticulum. Its walls were a deep red colour, smooth, and no vessels were visible.

Operation.—On the 22nd. Trendelenburg position. Bladder washed out, emptied as much as possible, and distended with air. Median incision from pubis to umbilicus; peritoneum opened. The diverticulum appeared like an immense bleb on the posterior wall of the bladder, to which it was adherent over a circular area about 3 in. in diameter. The bladder was then opened and it was found that the diverticulum was completely filled with a mixture of urine and lotion. This was mopped up. As it was impossible to find any line of cleavage between the bladder and diverticulum the former was split from front to back. The posterior part of this incision surrounded the orifice of the diverticulum, which was excised. The whole of the epithelial lining of the diverticulum was then removed, also the greater part of its outer wall, leaving only two peritoneum-covered flaps large enough to cover the raw surface. These were stitched in place, and the bladder wound sutured except for a small space left for a drainage-tube. The peritoneal cavity was then closed and the abdominal walls sutured. The ureters first passed downwards between the bladder and the diverticulum, then backwards beneath it, and finally upwards along its posterior surface. They formed ridges visible on the inner surface of the sac, and divided its lower portion into three pouches, a median and two lateral. The deepest portion of the diverticulum reached the level of the middle of the prostate. Its walls were very thin and were composed of a single sheet of muscular tissue lined by epithelium (Figs. 1 and 2).

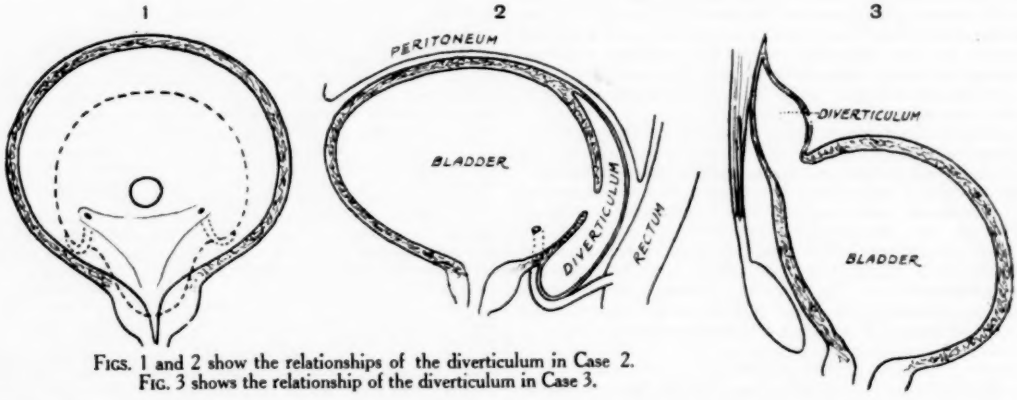
Course of Case.—The patient bore the operation well and left hospital in four weeks with his wound firmly healed. He returned in three months with a urinary fistula in the scar. He was admitted and the fistula was excised. Since then he has had no further trouble. He was last seen about two years ago. There was no frequency of micturition. The urethra admitted a No. 26 F instrument easily. Cystoscopy: Slight general cystitis. A puckered scar occupied the site of the old diverticular opening, from this a linear ridge ran forwards to the apex of the bladder. Residual urine 2 oz. The urine was slightly cloudy and contained pus and colon bacilli.

Both these cases have already been reported.[1]

CASE 3.—Male, aged 49, admitted to St. Peter's Hospital Sept. 2nd, 1912.

History.—Patient was treated for stricture 20 years before. In 1901 he was sounded for stone, but none found. Since then he had an attack of hæmaturia about every six months. For the last few months hæmorrhage at the end of almost every act of micturition. Old-standing cystitis and pyelonephritis.

Present Condition.—Frequency, every hour by day, six or seven times at night. Stream fair, precipitancy, never retention. Urethroscopy: No stricture. Residual urine, 11 oz.; prostate normal. Cystoscopy: Intense cystitis, especially on the base of the bladder. Ureters not visible. Opening of a large diverticulum near fundus just to the left of the air bubble, and of a smaller one to the right of the middle line on the posterior wall. Urine: Sp. gr. 1010, alkaline, albumin present, no sugar, blood small quantity, urea 1·8 per cent., sediment muco-pus.



FIGS. 1 and 2 show the relationships of the diverticulum in Case 2.
FIG. 3 shows the relationship of the diverticulum in Case 3.

Operation.—On the 4th. Bladder washed out and distended with air. Suprapubic incision, bladder exposed. Patient then put in Trendelenburg position and peritoneum opened. Diverticulum at apex of bladder running up into urachus. Peritoneum stripped off upper surface of the bladder and off diverticulum. Peritoneal cavity then closed. Bladder opened in middle line, incision prolonged upwards so as to surround diverticular opening. Urachus clamped and divided half way between pubis and umbilicus and diverticulum removed. At this point the urachus was found to be patent and filled with fæculent-looking material. It was followed up to the umbilicus and entirely removed. Bladder sutured round a large tube and abdominal wound closed. Diverticulum on the posterior wall only admitted tip of index finger and was not removed. (Fig. 3 represents the relationship of the diverticulum.)

Patient died, on the twentieth day after operation, of chronic pyelonephritis.

CASE 4.—Male, aged 61, admitted to St. Peter's Hospital March 10th, 1915.

History.—Had been treated for stricture on and off for 30 years. Urethroscoped in the out-patient department and no stricture found. Had a poor urinary stream all this time.

Present Condition.—Frequency of micturition every two hours by day, twice at night. Stream poor, straining, stream often interrupted, no precipitancy. Patient had numerous attacks of retention which necessitated catheterisation. No pain except slight scalding on micturition. Cystoscopy: No cystitis, both ureters normal. Orifice of a fair-sized diverticulum above and to the outer side of the right ureter. Prostate slightly enlarged. Residual urine, 2 oz. Urine: Clear, acid, sp. gr. 1018, no albumin or sugar, urea 1·7 per cent., no deposit.

Operation.—On the 12th. Trendelenburg position. Usual suprapubic incision. Diverticulum found to be about the size of a walnut. Freed from adhesions outside the bladder, invaginated into it, and cut away. Gap in the bladder wall sutured with continuous catgut. Prostate enucleated. Bladder closed round a large tube, lateral space drained.

Course of Case.—During convalescence patient developed double epididymitis. Discharged on May 9th. Wound firmly healed. Urine clear, no residual. Frequency four hours by day, once at night.

CASE 5.—Male, aged 63, admitted to St. Peter's Hospital April 14th, 1915.

History.—For five years frequency of micturition, sometimes every half hour. Suprapubic lithotomy March, 1914, passed stones soon after his return home. Passed as many as 13 in one day. Litholapaxy in September, 1914, and again in October, 1914. Passed more stones after both these operations.

Condition on Admission.—Frequency every three or four hours by day, twice at night. Stream good but often interrupted, some urgency, no incontinence. No hæmaturia. Urine: Turbid, offensive, alkaline, sp. gr. 1018, albumin present, urea 1·3 per cent., much ropy muco-pus. Bladder intolerant, cystoscopy impossible. Cystogram: Bismuth suspension. Diverticulum size of a hen's egg on right side of bladder. Long narrow neck.

Operation.—On the 16th. Trendelenburg position. Old scar excised, peritoneum opened. With the help of a finger in the peritoneal cavity the peritoneum was stripped off the bladder. Opening in peritoneum sutured and bladder opened. A loose stone was removed. Diverticulum found to be packed with calculi, which were removed. It was about the size of a hen's egg, and extended downwards to base of bladder. The ureter curved downwards and forwards, first behind and then below the orifice of communication. The diverticulum was very adherent but was freed and removed from outside the bladder. Gap in bladder wall closed with two layers of continuous sutures. Pre-vesical space and bladder drained, rest of wound sutured. The orifice of the diverticulum just admitted the index finger. It was about half an inch above and to the outer side of the right ureter.

Course of Case.—Convalescence uneventful. Patient discharged on May 26th. Wound soundly healed. No frequency of micturition. Urine still turbid. No residual urine.

CASE 6.—Male, aged 72, admitted to St. Peter's Hospital Sept. 1st, 1915.

History.—Frequency of micturition and straining for three years. Prostatectomy January, 1914. Was treated for cystitis March and April, 1914. His condition improved for a few weeks, then grew steadily worse.

Condition on Admission.—Frequency every ten minutes by day, every 45 minutes by night. Stream dribbling, great straining. Occasionally passed clots. Severe pain along the urethra during micturition. Urine: Turbid, ammoniacal, urea 1·4 per cent., much muco-pus, albumin present. Cystogram: Bismuth suspension. Bilateral diverticuli, each about the size of a walnut, standing well out from the bladder.

Operation.—On the 3rd. Trendelenburg position. Old scar excised. Bladder very adherent to surrounding structures, especially to the posterior surface of the pubis. Adhesions divided and bladder opened. The orifices of the diverticula were symmetrically placed, each about an inch above and to the outer side of the corresponding ureter. Bladder wall split down to the orifices and the diverticula dissected free and removed. Bladder wound closed round a large tube and each lateral space drained. The whole operation was rendered difficult and tedious on account of adhesions.

Course of Case.—Patient discharged from hospital on the 29th. Wound firmly healed, frequency two hours by day and night. Attended the out-patient department for a few months, during which time his urine became clear and he lost his frequency of micturition.

CASE 7.—Male, aged 49, admitted to St. Peter's Hospital June 20th, 1915.

Condition on Admission.—Frequency of micturition eight to ten times during the day, twice at night. Pain along the urethra during the act. No stricture, no enlargement of the prostate. Urine: Bacilluria, no albumin or sugar, urea 1·1 per cent. Residual urine 9 oz. Cystoscopy: Base of bladder and all round the internal meatus œdematous. Opening of a diverticulum just above and to the inner side of the right ureter. Ureteric orifices normal in appearance.

Operation.—On the 23rd. Trendelenburg position. Bladder widely opened. Diverticulum admitted index finger to a depth of almost 3 inches. Incision round orifice and diverticulum freed by blunt dissection. A ¼-inch tube passed through the bladder and into the space from which the diverticulum had been removed. Gap in bladder sutured round it. Bladder drained.

Patient discharged August 4th. Wound healed, no residual urine, no frequency.

CASE 8.—Male, aged 71, admitted to St. Peter's Hospital August 23rd, 1919.

History.—Fifteen years before had some difficulty in passing urine for three or four days. Well until April, 1919, when sudden retention of urine occurred, followed by a severe fit of shivering. Catheterised. Since then on complete catheter life, passing the instrument three or four times a day and once at night. Previous to April, 1919, frequency every two hours by day and every hour by night.

Condition on Admission.—Decidedly senile. Per rectum, prostate not enlarged. Cystoscopy. Slight intravesical projection of prostate. In the neighbourhood of right ureter, round orifice of an enormous diverticulum. Orifice about the size of a shilling, cavity very dirty. Right ureter could not be seen, left normal in position. Severe general cystitis. Cystogram: Thorium solution. Oblique position showed a double cavity, with the diverticulum low down in the right side of the pelvis. It was about the same size as the bladder. Antero-posterior position, showed cavity overlapping bladder, and extending far to the right. Urine: Sp. gr. 1010, acid, albumin and sugar present, urea 0·3 per cent., 183 gr. passed in the 24 hours.

Operation.—On Sept., 5th. Stovaine. Trendelenburg position. Median incision from pubis to umbilicus, bladder widely opened. With the hand in the bladder, the finger could just reach to the bottom of the sac. An attempt was made to invaginate the diverticulum into the bladder, by blunt dissection from without, aided by traction by means of a volsellum passed through the orifice. Dense adhesions binding the sac to the seminal vesicles, prostate, and rectum made it impossible to complete this invagination; however, the upper wall of the diverticulum was completely invaginated. A semicircular incision was then made, severing the upper portion of the neck of the sac (Fig. 4), and the diverticulum was inverted through this opening. This made it possible to reach its outer wall, and the surrounding tissues were then easily separated off by means of gauze dissection. The whole of the diverticulum was by this means turned inside out, and invaginated into the bladder. It was so large that more than half of it came through the abdominal wound. As the vesical orifice of the right ureter had never been identified, the ureter itself was exposed in the pelvis and opened. A catheter was passed down it, and appeared between two folds of mucous membrane, just within the diverticulum, opposite the lowest point of the opening. The sac was then cut away, except for a small semicircular flap surrounding the ureteric orifice. This flap was stitched over the defect in the bladder. The ureter was sutured, and the bladder wound closed round a large tube. The lateral vesical space was drained, and the abdominal wound closed round the tubes.

FIG. 4.—Stages of the operation for invagination of the diverticulum in Case 8. The dotted line in the last diagram indicates the flap of substance of the sac left in place and stitched over the defect in the bladder.

Course of Case.—The patient bore the operation well, but convalescence was slow. The suprapubic sinus closed after a catheter had been tied in for a fortnight. Patient sent to a convalescent home on Oct. 25th. Wound healed, but patient entirely dependent on his catheter.

Condition on Readmission.—April 10th, 1920. On catheter life since operation. Prostate: lateral lobes slightly enlarged, smooth, and movable. Cystoscopy: Shallow depression at sight of diverticular orifice. Small intravesical pro ec-

tion of middle lobe of prostate. Severe chronic cystitis. Urine: Sp. gr. 1020, acid, small quantity of albumin, moderate quantity of sugar, cloudy yellow colour, deposit of mucus. Phenolsulphonephthalein (intravenous injection) appeared in three minutes; 44 per cent. excreted in the first half-hour, and 11 per cent. in the second. Urea-concentration test: 1·9 per cent. in the second hour, and 1·7 per cent. in the third.

Operation.—Prostatectomy, on the 23rd. Stovaine. Bladder opened after it had been freed from the pubis. Peritoneum pushed upwards from the scar. Small prostate easily enucleated. Very little bleeding.

Course of Case.—Patient discharged on May 18th. Wound healed. Frequency two hours by day, twice at night. Residual urine one ounce. Urine turbid. He attended the out-patient department for a few months. General condition improved very much. Frequency normal. I heard from this patient on March 20th, 1923, as follows: General health good; no retention; frequency four hours by day, three times at night; stream good, urine clear; no pain or leakage through scar.

CASE 9.—Male, aged 50, admitted to St. Peter's Hospital Dec. 28th, 1920.

History.—Difficulty in micturition for 12 months, which was steadily getting worse. Frequency every hour by day, not at all during the night. Had cystotomy done one month before for over-distension, told he had a large pouch in his bladder.

Condition on Admission.—Suprapubic sinus through which all the urine came. Urine very foul, sinus surrounded by unhealthy granulations. Prostate slightly enlarged, hard nodule right lobe, whole gland movable.

Operations.—Cystotomy on the 31st. Sinus enlarged, opening of a large diverticulum found just outside right ureter. Bladder very foul, almost pure pus coming from diverticulum. Tube inserted into sac, and another into bladder. Daily irrigations. Excision of diverticulum, Jan. 14th, 1921. Stovaine and general anæsthesia. Trendelenburg position. Bladder widely opened, and freed from adhesions. Contents of diverticulum still very foul. Diverticulum freed from surrounding structures, invaginated into bladder, and removed. Operation very difficult on account of dense adhesions. Gap in bladder sutured. Suprapubic wound closed round large tube. Lateral vesical space drained.

Course of Case.—Patient discharged on March 13th. Slight suprapubic leak. Passing urine freely and without pain. On June 21st he was readmitted, with double pyelonephritis. Sinus enlarged, de Pezzer tube inserted. Patient sent to infirmary. (As I was out of town, I did not see this patient on his readmission.)

CASE 10.—Male, aged 51, admitted to St. Peter's Hospital June 26th, 1920.

History.—Frequency of micturition for two years, gradually getting worse. Difficulty in micturition for one year. Ten weeks before admission, complete retention. Metal catheter passed under general anæsthesia, but as it could not be passed a second time a perineal section and suprapubic cystotomy was performed. A diverticulum was then discovered. Bladder drained for ten weeks "in the hope that the diverticulum would contract." Venereal disease denied.

Condition on Admission.—Suprapubic and perineal fistulæ; most of the urine came through the former opening. Per rectum, prostate not enlarged. In the region of the left seminal vesicle a soft, elastic, sausage-shaped tumour was felt. It appeared to be adherent to the pelvis. Urine: Sp. gr. 1020, cloudy yellow, acid, albumin present, no sugar, deposit of pus. Urea concentration test, 1·65 per cent. in the second hour.

Operations.—(1) On July 2nd (stovaine), urethra easily dilated to 14/16, and 22 F. catheter tied in. Perineal wound allowed to heal. On the 23rd (2) cystotomy (stovaine and ether). Scar excised, and bladder opened. Diverticulum discovered on the left side. Opening about an inch above and to the outer side of left ureter. It easily admitted the index finger. Cavity very large, about the size of the clenched fist, was filled with exceedingly foul pus. Tube inserted into diverticulum and another into the bladder. Wound partially closed. Continuous irrigation was attempted, the fluid entering through the tube in the diverticulum and returning by the bladder tube, but it failed, as the diverticular orifice contracted round the tube placed in it and did not allow the fluid to circulate. (3) Excision of diverticulum on the 28th (stovaine, and ether after the first hour). Cystotomy wound reopened. Bladder wall very thick and indurated, which made it difficult to expose the interior of the viscus. Much peri-cystitis. Left lateral wall split down to the diverticular orifice. Sac very adherent, and was torn during removal, but the whole of it was got away. Peritoneum twice torn and sutured. Left ureter localised, and kept from injury. Left vas cut across. Bladder sutured round a large tube. Lateral space drained. Fowler position, Murphy's rectal drip.

Course of Case.—Patient discharged from hospital August 30th, 1920. General condition good. Wound soundly healed. Urine acid, slight deposit of pus. Could hold urine for two or three hours. Residual less than one ounce. On March 20th, 1923, I heard from this patient as follows: General health fair; frequency by day six times, once at night; urine clear, no pain, stream fair, no leakage through wound.

CASE 11.—Male, aged 53, admitted to St. Peter's Hospital March 4th, 1922.

History.—Since 1915 frequency of micturition, later difficulty and straining. Urgency and some incontinence for three years. For four months has catheterised himself every day, but was able to pass a small quantity of urine naturally.

Condition on Admission.—No stricture. Prostate slightly enlarged, soft, elastic, could be felt bimanually, freely moveable. Cystoscopy: Residual urine 9 oz. Very marked trabeculation. Numerous small saccules. Diverticulum on right side, at junction of posterior and lateral walls. Stone in post-prostatic pouch. Ureteric orifices not seen on account of intra-vesical projection of middle lobe of prostate. No cystitis. Urine, clear, acid, sp. gr. 1017, no albumin or sugar, daily urea 1·8 per cent., urea concentration test 3 per cent. Cystogram: Sodium iodide solution. Large diverticulum right side, long narrow neck. Numerous small saccules, especially near the base of the bladder.

Operation.—On the 15th. Suprapubic incision. Calculus removed. Bladder wall very thick, much peri-cystitis. Bladder wall split down to orifice of diverticulum, and sac excised. Right ureter and vas adherent to it. Prostate enucleated, and prostatic cavity packed with gauze. Wound in bladder sutured round a half-inch tube. Small tube in lateral space. Wound closed.

Course of Case.—On April 15th patient discharged from hospital. General condition excellent. Suprapubic wound healed, passing water freely per urethram. This patient was seen on Feb. 26th, 1923. Frequency four hours by day, occasionally once at night. Residual urine 1½ oz. Urine slightly cloudy. General condition very good.

CASE 12.—Male, aged 37, admitted to St. Peter's Hospital April 1st, 1922.

History.—Eighteen months before, pain in the hypogastrium, which had no relation to micturition. Six months later frequency and difficulty in micturition. Frequency then seven or eight times by day, twice or three times by night. Stream poor, only a small dribble, urgency. April, 1921, acute retention, lasted two days. Similar attack next month. July, 1921, suprapubic cystotomy for stone, but none found. Since then had passed a catheter once or twice a day on himself.

Condition on Admission.—Weak suprapubic scar, which broke down from time to time, and leaked urine. Bladder easily palpable when distended. Catheter life. Prostate normal. Cystoscopy: Distension 22 oz. Chronic cystitis, especially in region of trigone. No trabeculation. Two diverticula: (1) just above and to the outer side of the left ureter, contents turbid, orifice about the size of a lead pencil; (2) small one just above right ureter. Trigone displaced to right so that the left ureter lay almost in the middle line. Both orifices normal. Œdematous mucous membrane round orifice of large diverticulum. Both ureters catheterised. Clear urine from both kidneys. Urea concentration test, both kidneys gave 3·0 per cent. concentration. Same test applied to bladder urine gave 1·42 per cent. Internal urethral orifice normal. Cystogram: Sodium iodide solution. Twenty ounces of fluid injected. Bladder displaced to the right. Very large diverticulum filling up left half of true pelvis (Fig. 5). Bladder emptied as much as possible by catheter, and second exposure made. Diverticulum still distended, and a small amount of fluid in the bladder itself. (Fig. 6.) Urine: Turbid, alkaline, no albumin or sugar, daily urea 1·8 per cent. in 50 oz., or 306 gr.

Operation.—On the 19th. Left ureter catheterised. Trendelenburg position. Scar excised, bladder freed from pubis and opened. Diverticulum freed by blunt dissection, and gradually invaginated into bladder. Left ureter lay behind and below neck of sac, and was separated off. Diverticulum together with a small portion of bladder wall surrounding neck removed. Gap in bladder sutured. Lateral space drained, large de Pezzer tube in bladder. Wound closed. Diverticulum on right side too small to admit tip of finger, not removed.

Course of Case.—On May 8th patient discharged from hospital. Wound healed. Micturition normal. Frequency three hours by day, once at night. Residual urine 1½ oz.

FIG. 1.—Longitudinal section of a duct mouth into which two collecting ducts open, one being distended with secretion. The epithelial plug is shown in relation to the squamous-celled lining of the mouth. (× 20.)

FIG. 2.—Transverse section (paraffin) of mouth of a duct, showing laminated epithelial plug in position

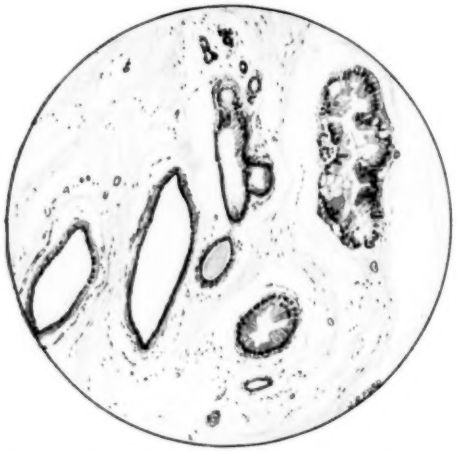


FIG. 3.—A group of ducts and acini, with swelling of epithelial cells in some and distension of others.

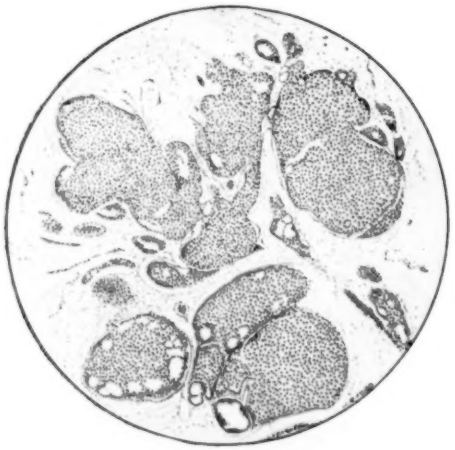


FIG. 4.—Massive epithelial proliferation in an advanced stage. A few acini can still be seen.

FIG. 5.—First stage of formation of papillomata in a duct. The epithelial cells are swollen.

FIG. 5.—Cystogram of Case 12 (sodium iodide solution) showing very large diverticulum filling up left half of true pelvis.

FIG. 6.—Second cystogram of Case 12 taken after bladder had been emptied as much as possible by means of a catheter. Diverticulum still distended with the sodium iodide solution, a small quantity of which also remained in the bladder.

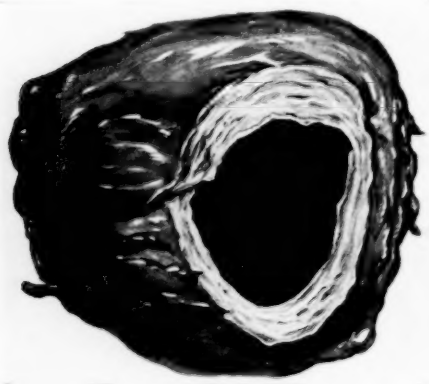


FIG. 7.—Diverticulum removed from Case 1.

FIG. 8.—Typical appearance of a diverticular orifice as seen through the cystoscope.

FIG. 9.—Diverticulum removed from Case 13.

DR. BEDO HOBBS: STRIÆ DISTENSÆ.

CASE 3, showing the striæ scattered all over the lower thoracic and lumbar regions.

On March 20th, 1923, I heard from this patient as follows: General health steadily improving since operation; frequency three or four times by day, twice by night; stream "splendid"; no pain; wound soundly healed.

CASE 13.—Male, aged 62, admitted to St. Peter's Hospital Jan. 5th, 1923.

History.—Ten years ago hæmaturia after straining at stool. Since then pain "in the bladder" whenever he has a cold, and occasionally a trace of blood in the urine. Five years later frequency and difficulty in micturition. Soon afterwards catheter life, passing the instrument twice or three times a day. Cystoscoped in 1912, and told "he had a sac." Admitted to St. Peter's Hospital Oct. 20th, 1919. Prostate removed; discharged Nov. 27th. Had intense cystitis at the time, and diverticulum apparently not noticed on cystoscopy. Suprapubic wound took 22 months to heal. Patient washed his bladder out every day with nitrate of silver by Janet's method. Had slight hæmaturia shortly after leaving hospital, and passed several small stones.

Condition on Admission.—Frequency of micturition, six times by day and twice by night. Micturition normal, stream and projection both good. Abdomen: Suprapubic scar, weak in its lower portion. When bladder was distended, it could be felt in right iliac fossa. Right kidney not palpable, left completely palpable, movable, enlarged, painless. Cystoscopy: Residual urine 30 oz. Bladder capacity 50 oz. Generalised cystitis with irregular bulging and sacculation. Right ureteric orifice active, fairly healthy, left large, patent, never closes. Opening of diverticulum fairly high up on the left side, difficult to see because left wall of bladder was pushed almost to middle line by the diverticulum. It appeared to be about the size of a sixpenny piece. Cystogram: Sodium iodide, 5 per cent. solution; 48 oz. injected. Enormous bladder pushed over into right iliac fossa. Diverticulum filled left side of true pelvis. Small slit-like space between bladder and diverticulum. Narrow orifice of communication. When bladder had been emptied as much as possible by means of a catheter, diverticulum remained nearly full, and there was still some fluid in the bladder itself. Urine: Hazy, sp. gr. 1012, alkaline, no albumin or sugar, daily urea 1·0 per cent. in 75 oz., or 322 gr. Urea-concentration test 1·5 per cent. in 3·5 oz., or 22 gr.

Operation.—On the 10th. Old scar excised and bladder opened. Trendelenburg position. Orifice of diverticulum about three-quarters of an inch in diameter, situated about an inch above and to outer side of left ureter. Catheter passed up left ureter. Diverticulum freed by finger and gauze dissection, and removed from outside the bladder. Gap in wall sutured by two layers of continuous catgut sutures. Internal urethral orifice about the size of a lead pencil, but was incised, as there was a "shelf" above prostatic cavity. Marion's tube in bladder, lateral space drained. Wound closed, catheter tied in. Fig. 9 (on Plate) shows the diverticulum after removal.

Course of Case.—Patient discharged from hospital Feb. 19th. Wound firmly healed. Micturition normal, no frequency. Residual urine ½ oz. I saw this patient on March 12th, 1923. General condition excellent. Micturition normal. Frequency four hours by day, once at night. Urine clear, a few small flakes in it.

CASE 14.—Male, aged 69, admitted to St. Peter's Hospital Jan. 7th, 1923.

History.—Three years ago difficulty in starting micturition. A few months later pain at tip of penis before and during act. Nocturnal frequency for 18 months. Complete retention two years ago.

Condition on Admission.—Bladder distended to umbilicus. Micturition, much straining, delay, and pain. Stream in drops only, some after-dribbling. Prostate only slightly enlarged, rather firm. No stricture. Put on regular catheterisation, 18 oz. being drawn off each time the instrument was passed. Urine: Turbid, alkaline, sp. gr. 1022, no albumin or sugar, much pus, daily urea 2·5 per cent. in 30 oz., or 327 gr. No cystoscopy when in hospital on account of over-distension.

Operations.—On the 10th, suprapubic cystotomy. Trivial intra-vesical projection of prostate. Diverticulum size of a hen's egg, above and to the outer side of left ureteric orifice. De Pezzer tube inserted. On the 24th, diverticulum excised from outside bladder. It was very adherent. Gap in bladder wall sutured with two layers of continuous catgut. Some thick peri-vesical fat sutured over opening. Prostate size of a cherry enucleated. It was fibrous, and contained several small calculi. Cavity packed. Marion's tube in bladder. No tube in lateral space.

Course of Case.—Sharp attack of secondary hæmorrhage on fourth day. Feb. 5th, large abscess left side of bladder. Tube inserted. Since then did well. On March 7th he passed urine naturally, but fistula not quite closed. On the 20th, still in hospital.

The Relative Values of the Different Operative Methods.

It is universally admitted that the only satisfactory treatment of this condition is excision of the sac, but there is a considerable divergence of opinion as to the best method of performing the operation. Before discussing this question, however, I wish to point out the dangers of a preliminary cystotomy in these cases. A cystotomy does not drain the diverticulum. When the bladder contracts round the cystotomy tube, the diverticular orifice closes, and the cavity is completely shut off from the bladder. Under these conditions no amount of vesical irrigations will disinfect the diverticulum, and its contents invariably suppurate. The deplorable condition that patients Nos. 9 and 10 were in when I first saw them was undoubtedly due to this cause. In both cases I tried to control the suppuration within the diverticulum by passing a tube into the sac through its vesical orifice, but in neither case was it possible to wash out the sac into the bladder, or the bladder into the sac. Each cavity could be washed out independently of the other, but this was not satisfactory, and in both cases I was forced to operate while the sac was still in a filthy condition. The walls of these sacs have practically no power of contraction, and remain in an inert flaccid condition, which predisposes them to stagnation and infection. When I am called upon in future to deal with such grossly infected diverticula I shall, as a preliminary to excision, open the bladder, and pass two small tubes into the sac, as well as leaving a larger one in the bladder itself. Continuous irrigation can then be carried out, the fluid entering the diverticulum by one small tube, and leaving it by the other. It is in many cases possible to drain the diverticulum independently of the bladder, but I see no advantage in this procedure. If the diverticulum lies below and behind the bladder, it can only be satisfactorily reached from the perineum, and this perineal drainage may render subsequent removal of the sac exceedingly difficult, if not impossible. I consider that a preliminary cystotomy should not be done, except when the kidneys are damaged so severely that it is obvious that the patient would not stand a primary excision. Even in these cases the bladder should only be drained for as short a time as possible, and means must be taken to drain and irrigate the diverticulum independently of the bladder.

Turning to the operation of excision, I feel that no set operation is suitable for all cases, but I think there are certain broad indications which would lead the surgeon to choose beforehand the operation best suited to the particular case. I also feel that it is not always possible to make a definite plan of campaign until the bladder has been exposed, as so much depends on the amount of peri-cystitis present, and on the number and density of the adhesions binding the diverticulum to neighbouring structures. One can learn the size and position of the orifice, the amount of trabeculation of the bladder wall, and the severity of the infection by means of cystoscopy; and the size, position, and to a certain extent the relationship of the diverticulum by means of cystograms; but one has no means of telling beforehand whether the sac is bound down by adhesions, or lying free in the fatty tissue of the pelvis. With regard to the operation itself, diverticula may be excised: (1) from the outer surface of the bladder; (2) by splitting the bladder wall down to the orifice of the diverticulum; and (3) from within the bladder.

(1) *Excision from Without the Bladder.*—This operation is best suited for diverticula situated high up on the lateral walls of the bladder, and for those occurring at the urachus. The operation may be either trans- or extra-peritoneal. A trans-peritoneal operation is indicated if the orifice of the diverticulum lies above the line of reflection of the peritoneum from the bladder wall, but these cases are not common, as the orifice is usually situated well below this level. In some cases it is a help to open the peritoneum when stripping it from the upper wall of the diverticulum,

but if this is done the bladder should not be opened until the abdominal cavity has again been closed. I have performed this operation on five of my cases (Nos. 1, 3, 5, 13, 14); in two of them (Nos. 3 and 5) I opened the peritoneum to facilitate stripping it back from the wall of the sac. The operation is facilitated if the bladder is opened and one finger placed in the diverticulum, while the upper and outer walls of the sac are cleared by gauze dissection. When the operator is dealing with the lower portion of the diverticulum, the finger in the sac is of no further assistance. The wall of the diverticulum is then grasped low down by means of a volsellum, and aided by traction on it the dissection is completed. I have not found it any advantage to plug the sac with gauze, and if the diverticulum lies low down in the pelvis, it is a positive disadvantage. The plug fills up almost the whole of the narrow space one has to work in, and renders the dissection much more difficult. I have tried this method on several occasions, and always had to remove the gauze again in a few minutes. This operation is rendered difficult if the bladder walls are thick and indurated, if the diverticulum is also thick-walled, and if there is much peri-cystitis.

(2) *Splitting the Bladder Wall down to the Orifice of the Diverticulum.*—This operation was first described by me in a paper read before the Urological Section of the Seventeenth International Congress of Medicine, which met in August, 1913,[2] and quite independently by Marion in November of the same year.[3] In my case, however, the operation was trans-peritoneal, while in Marion's it was extra-peritoneal. The idea underlying both these operations was the same, and was an attempt to obtain better exposure of the deeper parts of the diverticulum. I performed this operation in Case 2 (trans-peritoneally), and in Cases 6, 10, and 11 (extra-peritoneally). Case 6 was one of bilateral diverticula, and both sides of the bladder were split down to the necks of the diverticula. The incision is really a racquet, with a long handle and a small blade, as the orifice of the diverticulum is encircled, and a small portion of the bladder wall removed with the sac. The operation is indicated: (1) in cases where the diverticulum is situated low down on the posterior wall of the bladder; (2) when the walls of the bladder or diverticulum are thick and inelastic; and (3) when there is marked peri-cystitis. Case 2 came under the first category, and I do not think I could have removed this diverticulum by any other means. In Cases 6, 10, and 11 troublesome adhesions were present, due in the first case to a previous prostatectomy, in the second to a prolonged suprapubic and perineal drainage, and in the third to marked peri-cystitis. In Cases 6 and 11 the bladder walls were very thick. A rough estimate of the thickness of the bladder wall can sometimes be obtained by means of a simple cystogram. In every case of vesical diverticulum I have seen the walls of the bladder and of the diverticulum are in contact with each other round the diverticular opening. This means that the length of the neck of the diverticulum is equal to the combined thickness of these two walls, so that if the diverticular shadow lies at a considerable distance from that thrown by the bladder, and the two are only connected by a long isthmus, it is fairly safe to assume that the bladder walls are thick. I may also add that the walls of the bladder are always thicker than those of the diverticulum.

(3) *Intra-Vesical Operations.*—(*a*) Encircling the orifice by an incision through the whole thickness of the bladder wall, and removing the diverticulum by blunt dissection. I have only performed this operation once (Case 7), and have completely given it up, as I consider it dangerous. It is only suited for small diverticula, and is dangerous, as there is a great risk of wounding the ureter, which always lies in close relationship with the neck of the diverticulum.

(*b*) Invagination of the sac. This operation should be performed partly from inside the bladder and partly from outside it. It is a dangerous procedure to insert a volsellum through the diverticular opening, seize the fundus of the sac, and attempt to invaginate it. One operator drew a loop of small intestine into the bladder by this method, but fortunately discovered his mistake before dividing the neck of the sac. If it is decided to remove a diverticulum by this method, the upper wall of the sac should first be cleared as far as possible from the outer side of the bladder, and also from the surrounding structures. This portion of the diverticulum should then be invaginated through the orifice and seized from within. The dissection can then be completed from without, while traction is made by means of a volsellum gripping the portion already invaginated. This operation is only suitable for thin-walled diverticula that are comparatively free from adhesions. Young employs suction to invaginate the diverticulum.[4] This method requires an electric pump, as the suction obtained by means of a Sprengel's pump is quite insufficient for the purpose. I have performed the operation of invagination in three cases (Nos. 4, 9, and 12); I attempted it in Case 13, but was unable to complete the invagination, so I turned the sac back and removed it from outside the bladder.

(*c*) Combined invagination and inversion of the sac. This operation has been fully explained when describing Case 8, so I need not recapitulate it. I believe this method has not been described before, and I consider it a definite advance on the usual invagination method. As a matter of fact, I failed to invaginate the sac in this case, and I think I should have been unable to remove the diverticulum if I had not thought of inverting it. It can be employed in diverticula springing from any part of the bladder, but is particularly useful for dealing with large sacs situated deep down in the pelvis. It is eminently safe, as the outer surface of the diverticulum is well seen while the adhesions are being separated from it. It cannot, of course, be employed in cases where the wall of the sac is too stiff to allow of invagination, but this is the only definite contra-indication.

Operative Treatment in Cases Complicated by Enlarged Prostate.

Cases of vesical diverticula have frequently been diagnosed as enlargement of the prostate, and the gland has been removed before the presence of the diverticulum was suspected. This happened in Cases 6 and 13 of my series. I feel that in both these cases the patient's condition was rendered worse by this procedure. I have already alluded to the bad results obtained in cases where the bladder has been simply drained, and everything I have said regarding cystotomy applies with equal force to prostatectomy. I feel that the ideal procedure is to remove both the diverticulum and the prostate at the same sitting. This was done in Cases 4, 11, and 14 with excellent results. If, however, it puts too great a strain on the patient's powers of recuperation, the diverticulum should be removed at the first sitting, and the prostate enucleated as soon afterwards as is feasible. This course was followed in Case 8. Lastly, if the patient's condition is so poor that he will not stand any major operation, the bladder should be opened and independent drainage provided for the diverticulum in the manner already described. Even under these circumstances the preliminary drainage should be of as short a duration as possible.

Vesical Diverticula Complicated by Stone.

(1) *Calculus Lying Free in the Bladder.*—The mere removal of such a stone is never a complete operation. There may be others in the diverticulum. Even if there are none the diverticulum remains, and will probably give rise to symptoms. I do not think that a litholapaxy should ever be performed where there is a definite diverticulum. A case on which I operated some years ago illustrates this point. The patient had a stone about the size of a filbert lying free in his bladder, and on cystoscopy a small shallow diverticulum was seen just to the outer side of the right ureter. I thought it was too small to give rise to any symptoms, and so decided to crush the stone. It was

caught with the lithotrite, but when I commenced to crush it, it slipped out of the jaws of the instrument and I could not find it again. I then cystoscoped the patient and found the stone in the diverticulum. The bladder was opened and the stone removed from the sac, which was just large enough to hold it comfortably. The orifice of the diverticulum was then enlarged downwards and the wound closed. What happened to the whole calculus in this case may easily happen to fragments in others, and I feel sure this is one of the causes of recurrence in these cases. Case 5 also bears out this point. He underwent a suprapubic lithotomy and two litholapaxies in the space of about a year, yet when I operated there was a stone lying free in his bladder, and the diverticulum was packed full of them. I feel strongly that the correct procedure in all these cases is to open the bladder, remove the calculus, and excise the diverticulum.

(2) *Stone in the Diverticulum.*—Here the indications for removing the diverticulum are even stronger. Mere removal of the calculus may make the patient's condition worse, just as a simple cystotomy does. A very interesting case illustrating this point has been described by Kummer and Brutsch.[8] Their patient suffered from the usual symptoms of stone for over 20 years. He never had retention, and there was only a small quantity of residual urine. A stone was felt in his bladder, and the diagnosis confirmed by radiography, which showed a shadow filling up the greater part of the true pelvis. The bladder was opened and two calculi were found lying free in it, while a third was seen projecting from the orifice of a very large diverticulum, which it filled completely. They were all removed, but the diverticulum was left in situ. After the operation the patient was absolutely unable to pass urine naturally, and had to rely on self-catheterisation. The authors came to the conclusion that his retention was not due to atony of the bladder, but to the presence of the diverticulum. They advised an operation for its removal, but the patient refused it. If possible the diverticulum and the stone in it should be removed at the same sitting, but if the patient's condition will not stand this operation, one must remove the stone first. In this case the diverticulum must be drained independently, and the operation for its removal performed as soon as possible after the lithotomy.

Relationship between Ureter and Diverticulum.

It is important for the operator to bear in mind the close relationship between the ureter and the neck of the diverticulum. In the first place, the orifices of the "lateral group" of diverticula are always found in a limited oval area of the bladder wall, which lies above and to the outer side of the corresponding ureteric orifice. Occasionally the ureter opens into the diverticulum itself, in which case its orifice lies just within the lower and internal quadrant of the mouth of the sac. Outside the bladder the relationship is even more intimate. If the ureter is traced upwards from the point where it enters the bladder wall, it will be found to lie at first immediately below the lowest point of the neck of the sac. It then passes backwards and upwards behind it. This means that it follows the curve of the lower and posterior quadrant of the opening. If the ureter is traced still further upwards, it will be found to lie either in the cleft between the bladder and diverticulum, or to occupy a deep groove in the posterior wall of the latter. If the diverticulum stands well away from the bladder, the ureter lies between the two, but if it is in close contact with the bladder wall, and especially if it lies partly behind the bladder, the ureter occupies a deep sulcus in its posterior wall. In either case the ureter is compressed or displaced by the drag of the sac, and dilatation of its upper part and of the corresponding renal pelvis has frequently been observed. In eight of my cases the ureter was exposed during operation, and on each occasion it was found either to be dilated or thickened. If the ureter opens into the diverticulum itself it usually tunnels through the lower and posterior quadrant of the neck. This is simply an exaggeration of the usual relationship. The proximity of the ureter to the diverticular orifice must be borne in mind whenever the condition is treated by splitting down the partition between the sac and the bladder. Such an incision should not be made directly towards the internal meatus, but should be curved forwards a sufficient distance to avoid any chance of injury to the ureter.

Residual Urine.

Perhaps one of the most remarkable phenomena connected with vesical diverticula is the large amount of urinary obstruction they cause. In fact, obstruction and infection are the most usual indications for operation. The amount of residual urine is usually measured by passing a cathether immediately after the patient has emptied his bladder as completely as possible by micturition, but in some cases, especially if the diverticulum is large, it is impossible to drain off all the urine by this means. The amount left behind is often considerable, and may for convenience be called the "concealed residual." I first suspected the presence of this concealed residual in Case 2. At the operation the bladder was washed out and emptied as completely as possible, and then filled with air, yet when it was opened the diverticulum was full of lotion. The presence of this concealed residual was also demonstrated by means of the cystograms taken in Cases 12 and 13. In both these cases the first cystogram was taken when the bladder was filled to repletion. (Fig. 5 on Plate.) It was then emptied as completely as possible by means of a catheter and the second exposure made. In both cases the diverticulum remained full, and in addition there was a distinct shadow due to the presence of a certain amount of opaque fluid in the bladder itself. (Fig. 6 on Plate.) Although it is easy to demonstrate the presence of this concealed residual I do not know of any means of accurately estimating its amount. This concealed residual is of great practical importance as it renders all attempts to estimate the functional cativity of the kidneys, by means of tests applied to the bladder urine, fallacious. This applies both to the elimination of dyes and to the urea-concentration test, and if these methods are made use of the urine should be obtained directly from the kidneys by means of ureteric catheterisation. For example, in Case 12 the urea-concentration test carried out on bladder urine gave only 1·4 per cent., while the same test carried out on urine obtained by catheterisation of both ureters gave 3 per cent. of urea from each kidney. The latter was the true estimation of the renal function; in the first case the urine was diluted with lotion which could not be evacuated from the bladder by means of the catheter. If it is impossible to catheterise the ureters, one must depend on an estimation of the blood-urea.

Diagnosis.

In the majority of cases the diagnosis of the presence of a diverticulum is made by means of the cystoscope. The appearance of the orifice of a large sac is so characteristic that it is impossible not to recognise it at a glance. (Fig. 8 on Plate.) Occasionally, however, cystoscopy is rendered difficult on account of intense cystitis, or the orifice may be hidden by bullous œdema or a growth, or if the bladder has not been fully distended it may lie between two folds of mucous membrane. In these cases a cystogram should be made. The diagnosis of the size and relationship of the diverticulum can be made by means of cystograms, but to obtain the best results the technique must be carefully thought out. I now use a solution of sodium iodide which has been boiled and allowed to cool to the body temperature. The strength of the solution depends on the capacity of the bladder, which should be estimated beforehand. If it is less than 10 oz., I use a 15 per cent. solution, if it lies between 10 and 20 oz. a 10 per cent. solution is best, while if the capacity is more than 20 oz. a 5 per cent. solution is quite sufficient. If too strong a solution is used the shadow is so dense that it is difficult to distinguish between

the shadow thrown by the diverticulum and that thrown by the bladder. In Fig. 5 (on Plate) a 30 per cent. solution was used, but the shadow was much too dense, and there was practically no differentiation between the bladder and diverticulum. As a general rule, the weakest opaque solution that will give a satisfactory shadow is the best one to use. When the patient is on the X-ray couch a catheter should be passed and the contents of the bladder evacuated as completely as possible. The opaque solution should then be run in, either by means of a syringe or by gravity, until the patient experiences a desire to micturate. A spigot is then placed in the catheter and a radiogram taken in the antero-posterior position. The patient is then rolled over on his side until the shadow of the diverticulum is distinct from that of the bladder. The best position is easily determined by means of the fluorescent screen. If the diverticular opening is in the posterior part of the bladder, as it nearly always is, the patient should be rolled to the opposite side. A second exposure should be made in this position. Lastly, without altering the patient's position, the spigot should be removed from the catheter and the bladder emptied as completely as possible. A third exposure should then be made. This is to ascertain if there is any concealed residual urine.

Conclusions.

(1) Excision of the sac is the only rational treatment of vesical diverticula.

(2) No single set operation is suitable for all cases.

(3) If the case is complicated by prostatic or urethral obstruction both conditions should be treated at the same sitting. When this course is not feasible it is better to remove the diverticulum first, and treat the obstruction at a later sitting.

(4) A preliminary cystotomy does more harm than good in most cases.

(5) The presence of a calculus either in the bladder or in the sac is an indication for excision of the diverticulum.

(6) As a rule the ureter lies in close relationship with the neck of the sac, and must be guarded from injury during operation.

(7) The contents of a diverticulum cannot always be evacuated by catheterisation. The urine left behind after catheterisation, often a considerable amount, I have termed the "concealed residual."

(8) The presence of concealed residual urine vitiates all tests of the renal efficiency which are carried out on bladder urine. To obtain an accurate estimate of the renal function it is necessary either to catheterise the ureters or to trust to an estimation of the blood-urea.

(9) The presence of a diverticulum is best diagnosed by means of the cystoscope, and its size and position ascertained by means of cystograms.

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FACULTÉ DE MÉDECINE DE PARIS.—A post-graduate course in Dermatology and Venereal Diseases, under the direction of Prof. Jeanselme, will be held in the clinic of dermatology and syphilography, Hôpital Saint-Louis, and in the clinic amphitheatre (Salle Henri IV.) at 40, Rue Bichat, beginning on Oct. 5th (dermatology) and Nov. 14th (venereal diseases). Prof. Jeanselme will be assisted by Profs. Sebileau and Gougerot, and Drs. Hudelo, Milian, Ravaut, Lortat-Jacob, Louste, Lian, Darre, Tixier, De Jong, Sezary, Touraine, Coutela, Hautant, Lemaitre, Sabouraud, P. Chevalier, Burnier, M. Bloch, Hufnagel, Schulmann, Pomaret, Giraudeau, M. See, Bizard, Noire, Civatte, Ferrand, and Barbe. The fee for the course is Fr.150, and a certificate will be issued at its termination. Full particulars will be supplied on application to Dr. Burnier, Chef de Clinique à la Faculté, Pavillon Bazin, Hôpital Saint-Louis.

SOME OBSERVATIONS ON STRIÆ DISTENSÆ.

BY F. BEDO HOBBS, M.B., B.CH. CAMB., D.P.H.,
RESIDENT MEDICAL OFFICER, CITY OF LONDON HOSPITAL FOR DISEASES OF THE HEART AND LUNGS, VICTORIA PARK, E.

(With Illustration on Special Plate.)

Striæ distensæ, which are also called striæ atrophicæ although there is no histological evidence of a true atrophic condition, have been reported at various times in medical literature. These cutaneous changes were first observed on the extremities by Ascherson [1] in 1835, and between 1856 and 1863 Reuss,[2] Röser,[3] and Förster[4] reported cases in association with typhus, typhlitis, and dysentery. Köbner[5] states that in 1867 Auerbach told him of a case of a 15-year-old boy with striæ on the thorax. This appears to be the first recorded case in this situation. Since then the striæ have also been noticed in other parts of the body and many and diverse views as to their origin have been adduced.

The condition is generally stated to be rather rare, and the figures of observers who have had the opportunity of examining a large number of cases certainly tend to confirm this. Thus Kaiser,[6] referring to typhus, says among 1932 patients suffering from this disease he found 25 with striæ over the patella. Again, Warnecke [7] found 12 patients with striæ distensæ on the thorax among 2000 male cases of pulmonary tuberculosis, while among 4000 women and girls with the same disease not a single case was observed. Kai Hammer [8] also found 12 cases—10 males and 2 females—among 5800 patients treated at Boserup Sanatorium. It is, however, probable that these changes are not so rare as is commonly supposed—the fact that their onset is insidious and painless probably accounting for the fact that they seldom attract attention. In the course of the last six months I have seen ten cases of striæ distensæ of the thorax associated with various diseases, and in considering these I hope to disprove some of the theories put forward regarding the causation of the condition, and confirm and amplify others, emphasising the point that they are neither a separate clinical entity nor in any way the manifestation of one disease, but are merely the result of the association of certain clinical conditions occurring in the course of many diseases.

Position and Appearance of Striæ.

Striæ distensæ have been reported in association with typhoid, typhus, colitis, scarlet fever, mumps, rheumatic fever, cerebro-spinal fever, pleurisy, pneumonia, pulmonary tuberculosis, intestinal tuberculosis, malignant disease of the pleura and peritoneum, septicæmia, and as a result of trauma. In addition to these I have also observed them in cases of infective endocarditis, nephritis, and in one patient with an abscess of the liver. Striæ may be found in the neighbourhood of the anterior axillary fold, over the breasts, abdomen, buttocks, thighs, and above the patellæ. There is some evidence that they may occur in these situations in quite healthy individuals, but when associated with disease the postero-lateral portion of the thorax, about the level of the eighth to twelfth dorsal vertebræ, appears to be the commonest situation. The skin changes may be unilateral or bilateral; in the latter case they are usually more marked on one or other side.

When they first occur the striæ are purplish in colour and appear as a series of irregular livid streaks, in which, in a few instances, small hæmorrhages are seen. The colour gradually changes to a dusky mauve and after some months fades altogether, taking on the pearly-white appearance of scar-tissue. The striæ are depressed below the level of the surrounding skin, as can easily be felt by running the finger across them, but some, in the later stages, of which Case 7 was an instance, take on a keloid appearance and are raised in the form of wheals. The lines are as a rule rather irregular in

outline and vary from ½ in. to 8 in. in length with an average width of about ½ in., although in one of my cases a recently formed stria was ⅛ in. in width. On the back these lines are horizontal, while on the front of the abdomen they are vertical, tending to run obliquely outwards and downwards as they occur nearer the flanks. On the thighs and over the axillæ they are also more or less vertical, but are horizontal when found above the patellæ; that is, in all situations the long axis of the striæ is perpendicular to the direction in which the maximum tension which seems to have caused them is exerted. In the majority of cases the onset is insidious, and the striæ are not noticed by the patients until their attention is directed to them by the doctor or nurse.

Sir Dyce Duckworth [9] reported a case with striæ distensæ over the outer side of one thigh in which there was a marked degree of hyperæsthesia in the affected area. One of my patients, Case 7, also complained of soreness around some of the newly-formed striæ, but none of the other patients had noticed the presence of their striæ. Freund [10] and Craven Moore [11] have reported cases in which there was some blunting of sensation over the striæ, but in the vast majority of cases no sensory changes are found.

The striæ appear to occur only in young adults, the ages of my ten cases being within the narrow limits of 15 to 18 with one exception, who was aged 24. The age period of practically all the cases to which I have referred in the literature also lay between 12 and 22. 80 per cent. of these being between 15 and 20. One of Warnecke's patients was aged 49 but had been ill for 26 years, and there was no note as to when the striæ had first appeared. This restricted age-incidence alone ought surely to throw some light on the ætiology of striæ distensæ. There seems to be some difference of opinion regarding the sex-incidence. Cramer, [12] Warnecke, [7] and Hammer [8] have found a great preponderance among the male sex, while Schultz [13] and Riecke [14] report the reverse. In my ten cases the sexes are equally divided.

The following is a brief history, together with a short description of the striæ distensæ found in ten cases:—

CASE 1.—Female, aged 18, well nourished, with fairly advanced tuberculosis of both lungs of one year's duration. Confined to bed since May, 1922. Irregular evening rise of temperature throughout. Well-defined purple striæ distensæ in lower dorsal region on both sides—more marked on right. These were first noticed in January, 1923, but had probably been there some time. A few striæ actually over the vertebræ. Always lies on her back. Lost 12 lb. in last nine months.

CASE 2.—Female, aged 16, emaciated, with extensive tuberculous disease of left lung and early disease right side, three months' duration. Evening temperature of 101° to 102° F. A few recently formed striæ on postero-lateral portion of right side in lower dorsal region. Lies on right side.

CASE 3.—Male, aged 17, fairly well nourished, with extensive tuberculous disease of right lung, of 14 months' duration. Artificial pneumothorax induced on right side, July, 1922, followed two and a half months later by pleural effusion. Pyrexia during first few months, which later disappeared, except for an occasional rise. Well-defined striæ distensæ on both sides of back from ninth dorsal to first sacral vertebræ (see photograph). These appeared early in September before pleural effusion appeared. Usually lies on his back, occasionally on his right side. Gained 2 lb. in eight months.

CASE 4.—Male, aged 17, poor nutrition, rather toxic, and myoidema present. Tuberculous infiltration of both upper lobes and also larynx, six weeks' duration. Average evening temperature 99·6° F. Faintly marked striæ over right lower ribs in lower dorsal postero-lateral region. A few also over posterior folds of axillæ. Always lies on right side. Gained 11 lb. in last six weeks.

CASE 5.—Male, aged 15, poor nutrition, with pleural effusion of left side, which gradually resolved over period of three months. Irregular evening temperature for first month. A few purplish striæ in lower dorsal region left side. Lies on left side. Gained 19 lb. in three months.

CASE 6.—Male, aged 15, with advanced rheumatic endocarditis. Ascites and œdema of legs on admission which rapidly disappeared. Large liver and spleen. Confined to bed three months. Slight pyrexia occasionally. Striæ distensæ of recent origin noticed in right lower dorsal region in February, 1923—i.e., three months after admission. Usually lies on back, but frequently on right side.

CASE 7.—Female, aged 18, rather fat, with morbus cordis of rheumatic origin, auricular fibrillation, and recent infective endocarditis. In hospital for six months in 1921, when striæ developed in right lower dorsal region. By 1923 these had become very deep pearly-white scars running more or less parallel with the lower dorsal ribs. Below these on the right flank were very prominent raised striæ passing obliquely upwards and forwards from the posterior part of the iliac crest towards the abdomen, ending in the nipple line. These were almost keloid in appearance, and were called striæ hypertrophicæ. In the left lower dorsal region and over the delto-pectoral triangles and the front of the abdomen were more recent scars of a livid hue. These were transverse over the back and more or less vertical over the arms and middle of abdomen, becoming more oblique as they approached the flanks. The liver was enlarged and tender, and there was some ascites. Two days before death patient complained of a well-marked, tender, recently formed stria present in each iliac fossa. During her previous illness in 1921, patient stated she used to lie on her right side; recently she remained almost entirely on her back.

CASE 8.—Female, aged 15, with mitral stenosis following two attacks of rheumatic fever. Confined to bed entirely for two months, and then got up gradually. Pyrexia for first fortnight. Striæ distensæ in lower dorsal region on both sides and in mid-line of back appeared about two months after admission to hospital. Always lies on back. Gained 6 lb. in four months.

CASE 9.—Male, aged 21, with parenchymatous nephritis of three months' duration, associated with œdema of thighs and lumbar region. Recently formed purplish striæ in lower dorsal region on both sides and also on thighs. Irregular evening temperature throughout illness. Always lies on back.

CASE 10.—Female, aged 24, with large liver abscess, secondary to small localised appendix abscess. Consolidation of right lower lobe. Very large liver. Duration of illness two months. Marked pyrexia and toxic symptoms throughout. Very marked lineæ distensæ over lower dorsal region almost entirely on right side, noticed about six weeks after onset. Lies on back.

Ætiology.

It appears that in some cases the striæ occur as a direct result of distension from within, caused by subcutaneous œdema, or pleural and peritoneal effusions. I have recently seen striæ over the dorsum of both feet in a girl aged 12 suffering from pronounced cardiac œdema, and conclude that a simple distension of a badly nourished skin was the cause of their appearance. The striæ on the thighs of Case 9 were probably produced in the same way.

They are, however, often found in the absence of any sort of effusion, and can then be classified according to the anatomical position which they occupy: 1. Striæ found in the neighbourhood of the anterior axillary fold, and on the breasts, abdomen, thighs, and buttocks. In all these situations there is a tendency for fat to accumulate. 2. Striæ found in the lower thoracic region and above the patellæ. In these situations there is very little tendency for fat to accumulate, and the effect of position seems a much more potent factor. In both cases the underlying features of production are the same. Kai Hammer [8] has reported a series of 12 tuberculous cases, all of which fall into the first group described above, and concludes that they are due to distension of the skin caused by the rapid accumulation of fat in the subcutaneous tissues.

I have recently seen two cases which support this view. One was a girl, aged 20, in perfect health, who had gained 1 stone in nine weeks, and whose thighs had increased 1 in. in circumference. She consulted me because she had noticed some livid mauve lines running vertically on the inner and outer sides of both thighs. On examination these were found to be well-defined striæ distensæ. The other case was a young man who, during convalescence after an empyema, had gained 1 stone in 12 weeks, and had developed striæ over both deltoids and above the anterior axillary fold. He stated that his chest measurement had increased to such an extent that his coat and waistcoat, which had previously been loose, now felt extremely tight and uncomfortable.

It seems that there is one group of cases at the adolescent period characterised by striæ in situations where large deposits of fat are rapidly laid down. In this group the growth of the skin is unable to keep pace with that of the subcutaneous tissues and the striæ occur as a result of this rapid distension. Hammer's conclusion that the striæ of pulmonary tuberculosis are directly due to a gain of weight appears unwarranted when their occurrence in other situations such as the thorax is considered. Among my ten cases of thoracic striæ only two showed any appreciable gain in weight. The comparative frequency with which the striæ have been found in typhoid and other prolonged diseases in which there is a tendency to lose flesh also does not seem to support Hammer's theory. Other observers have taken the opposite view—namely, that the striæ are the result of emaciation and malnutrition, a theory for which, per se, there also appears to be very little evidence.

A neurogenic origin has been suggested by several people, but no conclusive evidence for this has been produced, and it is impossible in the majority of cases to correlate the situation of the striæ with the disease from which the patient is suffering. Striæ distensæ are frequently found on the side opposite to that of the lung lesion, which fact, together with the absence of any pain, is difficult to explain on the basis of a neurogenic origin. Similarly there is no evidence to support the theory that there is a trophic influence at work on the skin. If this were the case why are the striæ usually so localised, and why are there no obvious sensory or vaso-motor changes? It is possible that minute hæmorrhages or thromboses may occur in the skin and play a part in the production of the striæ. The section of one of my cases examined microscopically certainly shows many points of hæmorrhage into the dermis.

The effect of posture, however, seems much more important, a point on which Parkes Weber [15] has already laid emphasis. In those patients who generally lie on the back the striæ were found on both sides of the mid-line, although it was noticed that there was a tendency for them to be more marked on the right side, possibly from the fact that the majority of people lie more on the right side than on the left. The position and weight of the liver may also affect this. Where the striæ were confined to one side I found on inquiry that without exception the side affected was the one on which they were accustomed to lie or had lain during their illness. In those patients who are in the habit of lying on their backs and who while in bed adopt a semi-reclining position with their shoulders propped by pillows, the lines are found in the lower dorsal region, which is the position of greatest convexity, where the skin is maintained at its greatest tension. Similarly, in a person who lies on one side, the point of maximum convexity is in the region of the postero-lateral portion of the lower part of the thorax where the striæ are commonly found. In the same way, transverse striæ are produced above the patellæ in patients who lie in bed with their knees drawn up, particularly in abdominal conditions such as typhoid. In cases of pleural effusion one may expect to find striæ distensæ on the homo-lateral side. In pulmonary tuberculosis, however, when the lesion is more or less one-sided, the striæ are found on the contra-lateral side. This is due to the fact that patients with unilateral pulmonary tuberculosis nearly always lie on the unaffected side.

Cramer [13] described seven cases of more or less unilateral pulmonary tuberculosis, in all of which the striæ were found on the contra-lateral side. This was ascribed by him to the compensatory distension of the chest on the healthy side, but although there is no record as to which side they lay on, it seems probable, in view of the nature of the disease, that it was on the healthy one, on which side the striæ appeared. All my cases were confined to bed for long periods, the shortest being six weeks, during which time the majority of them had well marked and continued pyrexia. This is not regarded as an essential factor in the production of the striæ, particularly as they have been found to occur in the absence of any fever, but it is merely a manifestation of the toxæmia of varying degree which appears to be a common factor in the debilitating diseases with which these cutaneous changes are frequently associated.

The narrow age-limit leads one to suppose that the skin at this period is much more susceptible to such changes. From 15 to 20 is the age when great structural alterations in the body, particularly the skin, are taking place, and if the nutrition is at all impaired by any toxic condition or prolonged disease, the skin being very delicate, the elastic fibres are more easily ruptured when subjected to any strain. This condition is somewhat analogous to rickets, where within a definite age-period, bony changes occur as a result of deficient nutrition.

Relation of Striæ Distensæ to Lineæ Gravidarum.

An interesting point is the relation of these striæ distensæ to lineæ gravidarum. Is the mode of origin the same in the two cases? Some observers are inclined to think that it is, but although there is some similarity it seems probable that the two conditions are not identical. Lineæ gravidarum are found at any age during which pregnancy occurs, while the age-period is very strictly limited in the case of striæ distensæ. There is also a difference in colour. The striæ gravidarum are pinkish-white in appearance even when first formed and never present the livid purple colour of striæ distensæ, which seems to indicate a more profound change. One might argue that the general nutrition of the body, including the skin, is lowered during pregnancy, and that the pressure of tight clothing on the distended abdomen acts in the same way as the pressure produced by lying in one position. A comparison of the microscopical appearances in the two conditions should throw some light on the question, but I have unfortunately not had the opportunity of doing this.

Microscopical Appearances.

In only one instance (Case 7) have I been able to obtain sections of the striæ for microscopical examination. These, together with control sections of normal skin, were stained by the Pianese method, and also by a combination of Van Gieson's and Weigert's stain, which demonstrated the elastic fibres very clearly. The epidermis showed no appreciable difference as compared with the normal skin, but well-defined changes were observed in the cutis vera. The connective tissue bundles appeared to be more spread out and parallel than in the normal, but the most noticeable change was in the elastic fibres, which were broken up into small strands and scattered irregularly over and around the connective tissue bundles instead of being intimately intertwined among them. In the centre of the stria the elastic fibres seemed to have disappeared entirely, but their retracted stumps were found lying curled up in little bundles on either side. Sections of the hypertrophic striæ from the same patient showed a great increase of connective tissue layer, scattered through which were a great number of blood-vessels. In these sections there appeared to be very little elastic tissue, and what there was was confined to the periphery of the scar.

Conclusions.

The conclusions at which I have arrived are:—

1. That striæ distensæ are confined almost entirely to young adults between the ages of 12 and 22.

2. That at this age the skin is very delicate and growing rapidly, and that the elastic tissue fibres rupture allowing the white fibrous tissue and overlying epidermis to stretch, giving rise to striæ distensæ.

3. That striæ distensæ may be associated with almost any febrile illness.

4. That the distension and ultimate cleavage of the skin may be caused in healthy individuals by the rapid accumulation of fat in the subcutaneous tissues of the axillæ, thighs, &c.

5. That in other cases it is due to a simple distension following an effusion into the subcutaneous tissues.

6. But that often the nutrition of the skin is impaired by some constitutional disease, and that the main factor in these cases is the effect of posture—the striæ occurring at the position of maximum tension.

Finally, I wish to express my thanks to the physicians of the Victoria Park (Chest) Hospital for their courtesy in allowing me to publish these notes of the cases under their care, and to Mr. A. W. Smart, of the Pathological Department, for preparing and staining the skin sections.

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HOME DISINFECTION AND THE CONTROL OF SCARLET FEVER.

BY K. SIMPSON, M.D. EDIN., M.R.C.P. LOND., D.P.H.,
DEPUTY MEDICAL OFFICER OF HEALTH, COUNTY BOROUGH OF CROYDON.

THE following remarks regarding scarlet fever and home disinfection apply to that disease, neither as representative of infectious diseases as a whole, nor, generally speaking, to the practical sanitary measures necessary in all cases for their prevention. It would be quite fallacious, for instance, to suggest that tuberculosis—a disease differing widely from scarlet fever both ætiologically and epidemiologically, although possessing the common feature of infectivity—could be controlled similarly to scarlet fever from the preventive standpoint.

The chart, which is taken from the annual report of the medical officer of health, Croydon, for 1922—in great measure a replica of that produced the previous year—shows clearly that the most important factor in the spread of scarlet fever is school attendance, the disease waxing or waning according as the public elementary schools of the borough were open or closed during the year, allowance being made for the pre-school period of life which always accounts for a considerable number of cases. Although milk supplies, laundries, domestic animals, &c., have all been credited in the past, and probably not without some good reason, with furthering the spread of scarlet fever, the fact remains that the disease is one, in the great majority of instances, affecting school life and the pre-school period, and that by far the most important agent in its spread is school attendance, although in a minority of instances other factors, such as those mentioned, do from time to time play a certain part, although even in them a missed case or a carrier is, in all probability, the primary focus of dissemination.

Spread of Scarlet Fever.

Scarlet fever is spread by actual cases of the disease, carriers, and to a less extent by fomites, provided sufficient pabulum for an outbreak—general or sporadic—is available in susceptibles, that immunity which is known to exist during the first year of life becoming in many cases exhausted in succeeding years. Actual cases of scarlet fever may be recognised or not, the latter group including mild cases confused with rubella, and others which may have been missed altogether. Definite cases, generally speaking, explain the spread among home susceptibles, see table, column C, where the primary case is nursed at home, whilst mild ambulant and missed cases are responsible for a certain percentage of those spread by school attendance, the majority of school infections being, in all probability, due to the carrier. Carriers in scarlet fever, as in other similar infections, are of two types—the direct and the indirect—and in some 50 per cent. of cases may exhibit certain obvious clinical symptoms associated with the carrier state. The direct carrier has previously suffered from the disease, whilst the indirect carrier, so far as is known, has not. Direct carriers include those also who, after return from home or hospital isolation, have given rise to "return" cases. Carriers, therefore, in many instances may attend school from homes which have been previously disinfected to the satisfaction of the sanitary authority, and may also presumably come from homes where there has been no previous suspicion of infection. Parenthetically the value of home disinfection can, even at this juncture, be seen to be almost nil in so far as the danger to be apprehended from the carrier is concerned, who after the customary period of isolation has returned to school, disinfection meanwhile of the home playing no part in any lessened tendency to further spread of infection through the medium of school attendance and carriers, or the further infection of home susceptibles by carriers before resuming school. Fomites include all infected or presumably infected articles in a home where a case of infectious disease is known to have occurred.

Home Disinfection.

Disinfection, as at present carried out by most sanitary authorities, briefly consists in spraying infected rooms and fomites with either a weak solution of izal or formalin, or generating sulphur dioxide by burning sulphur candles on the premises (besides certain other less commonly practised methods occasionally made use of) after the patient's removal to hospital, or where the case has been nursed at home, after the return of the case from isolation. At the same time the clothing and bedding of the patient are usually removed and disinfected by the sanitary authority—in my opinion the only useful part of the procedure. In the table will be found certain particulars relating to the incidence of scarlet fever during the years 1921 and 1922 in Croydon, excluding for reasons of comparison all cases occurring at institutions during the period. Col. A deals with all cases removed to hospital and where the home was disinfected within 48 hours. Col. B deals with cases nursed partly at home and partly in hospital during an epidemic period extending from the beginning of

Table giving Particulars Relating to Scarlet Fever Cases Notified during the Years 1921 and 1922, but excluding all Cases occurring at Institutions in the Borough of Croydon.

Col. A.—Hospital cases removed within 48 hours.
Col. B.—Home cases and hospital cases (nursed more or less at home and hospital—epidemic period).
Col. C.—Home cases, including a small number ot removed during epidemic period.

—	A.	B.	C.
Number of cases notified	972	254	239
Number of "susceptibles" under 15 years of age in infected houses at onset of illness of primary case..	1148	301	155
Number of secondary cases occurring from onset of primary case. (1) During first seven days ..	85	13	17
Percentage to susceptibles	(7·49)	(4·31)	(10·96)
"Incidental" infections—i.e., (2) after seven days and prior to the primary case leaving isolation or before return from hospital ..	50	20	18
Percentage to susceptibles	(4·35)	(6·64)	(11·61)
(3) "Return" infections	35	1	1
Percentage to susceptibles	(3·1)	(0·33)	(0·64)
Total of "incidental" and "return" infections	85	21	19
Percentage of this total to "susceptibles"	7·3	6·9	12·2

November, 1921, to the end of April, 1922, when the isolation hospital was over-full. These latter cases were removed as and when hospital accommodation could be found, the usual home disinfection being subsequently carried out. Col. C deals with home cases entirely. The percentage of secondary cases to susceptibles is greatest among home cases—obviously due to direct infection from the primary case—both during the first seven days after occurrence, 10·96 to 7·49 and 4·31, and subsequently (" incidental " infections), but prior to the return of the original case from isolation, being 11·61 in home cases compared with 4·35 and 6·64 respectively in the others.

With regard to hospital cases which were removed and the home disinfected within 48 hours, the infective influence of the primary case may not have been altogether effaced before the end of the first week, but subsequently to that period and disinfection the primary case can presumably hardly be expected to have exerted any influence at all upon the occurrence of subsequent cases. Disinfection and hospital isolation, therefore, fall considerably short of preventing secondary cases amongst susceptibles in homes where primary cases have occurred, whilst we see from the chart that the disease is spread in the great majority of instances through missed or carrier cases attending school or carriers of pre-school or school age at home, factors over which home disinfection exerts no control, even assuming for purposes of argument that such disinfection has been accurately and effectively carried out. (Other facts borne out by the table, such as the superiority of hospital over home isolation, and the greater proclivity for hospital cases to account for " return " cases, does not concern the further trend of this article.)

If fomites and infected houses, rather than carriers and mild cases, are to be credited with the spread of scarlet fever generally, it is obvious how almost useless the practice of disinfection has been, almost amounting to a confession of failure hitherto to prevent the further incidence of dissemination of infection, whether we consider the incidence of home or school cases.

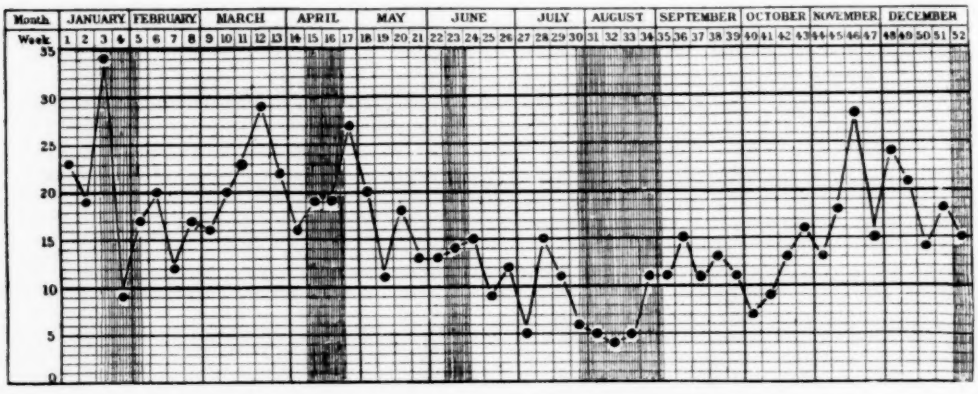
Carriers of the Disease.

How, it may be asked, is scarlet fever perpetuated, and how is the outbreak initiated? The answer, I believe, is in both instances, through the recent or chronic carrier, the former instrumental in acute outbreaks, while the latter, mainly recruited from the former, is concerned with the appearance of sporadic cases and the initiation of actual outbreaks. A defect in the chain of sequence is, however, created through our still incomplete knowledge of the bacteriology of this disease. Whether or not the particular causative streptococcus described represents more than a symbiotic combination conditioned by the pathological states present in the sufferer or carrier and analogous to the association of Hofmann's bacillus with the throat in diphtheria, we have yet to learn.

A carrier probably possesses two requisites—a particularly low bactericidal power for some specific micro-organism, and an abnormal or pathological condition of the naso-pharynx suitable in the case of scarlet fever either for its parasitic endurance, or more probably some resting phase of its existence. On the other hand, the condition present—pathological or otherwise—may be such that the parasite cannot effectively be dealt with by the anti-parasitic powers of the host. An actual outbreak of scarlet fever is, so far as we can tell, dependent upon a degree of overcrowding either at home or in school during the presence of certain meteorological conditions met with in England, more particularly during the last quarter of the year, and presumably absent in some tropical parts where the disease has not yet appeared. When cases of scarlet fever begin to appear, can the disease be, in any particular, further prevented by disinfection after the primary case has been removed to hospital? I think not with any degree of success, because, as I have already attempted to show, the disease is mainly, if not entirely, spread by carriers and mild or missed cases both at home and through school attendance, and secondly because home disinfection cannot in any sense of the word be regarded as complete and satisfactory. Complete disinfection of an infected room cannot, for example, be satisfactorily carried out in the many one-roomed tenements met with in any of our large towns, unless all the contacts could be removed from their surroundings for some 24 to 36 hours. The clothing of the contacts again—in many cases the only clothing possessed—cannot practically be dealt with as regards satisfactory disinfection, assuming that contacts are infectious through their clothing, a point which I am not prepared, to any extent, to admit.

To summarise the question of home disinfection, therefore, it will be admitted that at best it is little more than a formal, much less than a complete proceeding, and consequently can neither reasonably prevent subsequent infection occurring in an already apparently disinfected home amongst susceptibles—susceptibles of school age being meanwhile excluded from school—nor the subsequent spread of the disease once an outbreak has occurred which is, as already suggested, almost entirely dependent on carriers and school attendance, rather than fomites, leaving out of account for the present sporadic cases met with from time to time in the adult. I am strongly of opinion that much of the funds at present spent upon disinfection could be more usefully employed in creating a healthier state of the naso-pharynx of the school-child by directing greater precision to the examination and

CHART SHOWING WEEKLY NOTIFICATIONS OF SCARLET FEVER, 1922.



The shaded portions represent periods during which the schools were closed.

treatment of all such defects discovered upon routine medical inspection of school-children, by preventing overcrowding in schools, and by the prompt closure of all schools or school departments—public, private, and Sunday—in any area threatened with an outbreak of scarlet fever. By these measures can it be hoped, in the future, to more surely approach the eradication of such a scourge of young life as scarlet fever is, rather than by further pursuit of the phantom of home disinfection, at best but an incompletely carried out procedure justifying neither the time nor the money spent upon its performance.

So far as home disinfection is required after the patient's removal, blankets, &c., from the home used in conveying him or her to hospital should, as a matter of course, be disinfected before their return, whilst the further disinfection of the home need only, in my opinion, be directed to an effort on the part of the occupants to spring-cleaning their infected room or apartments by the application of the less extravagant if not equally efficacious disinfectant properties of sunlight, soap, and water. Such an arrangement, however, would not prevent householders who wished their premises disinfected after the orthodox manner from having the same carried out by the sanitary authority on the payment of an arranged fee.

The opportunity was taken at the outset of this article to emphasise the fact that remarks applicable in so apparently simple a matter as home disinfection after scarlet fever would not necessarily be true in respect of other infections belonging to a different category, such as tuberculosis. In closing, let it be similarly emphasised that the aim of this article has been not an attempted refutation of the principles of disinfection when rightly and appropriately used, but rather an analysis of the present inadequacy and inutility of home disinfection as a means of controlling the spread of scarlet fever.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT PORTSMOUTH.

(*Continued from p. 362.*)

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

WEDNESDAY, JULY 25TH.

AT the opening session Dr. HENRY DEVINE (Portsmouth), the President, gave a short address in which he recorded the changed outlook of psychiatry which was coming to regard itself as a branch of general medicine. A discussion on

The Nervous Child

was opened by Dr. H. C. CAMERON (London), who said that he proposed to confine his remarks to two aspects of the wide subject which he had to talk about. He would describe certain peculiarities of physique and posture which were frequently found in the nervous child and would examine briefly the rôle played by parental management in provoking or controlling the disturbances of behaviour for which advice was sought. In most nervous children one was struck by the want of tone in the skeletal muscles. The trunk was not braced by the muscles at the back, the feet tended to be separated, and the shoulders carried far back, the abdomen being pushed forward, while the chest receded. The lack of tone in the shoulder muscles allowed the weight of the upper limbs to depress the points of the shoulders and so produced winged scapulæ. As a rule the small muscles of the face and hands were in constant movement, but in some of the worst cases the facial expression had been that of complete apathy. The posture and movements of the child were a good index of the state of the nervous system. Lack of tone was not confined to the skeletal muscles, but also involved those of the heart and blood-vessels, hence the pallor usually seen in these children. Albuminuria and cyanosis of the extremities were also common. Attacks of abdominal pain, and sometimes of vomiting, were generally due to emotional excitement or fatigue. The defect of posture sometimes led to enteroptosis. These children also were subject to frequent catarrhal infections, their lack of immunity probably being associated with the poor vaso-motor tone. Children of this type also tended to show abnormal temperature variations, giving a subnormal reading when exhausted, and showing variations above the normal when excited and flushed.

The study of the nervous child was to a great extent a study of his parents. In hospital little, on the whole, was seen of functional nervous disturbances because of the change of environment. At home the reaction of the child depended very largely on that of the mother. The young child was very prone to suggestion. Whatever was thought of him, said of him, even feared for him, that he was apt to become. Therefore, the symptoms of functional nervous disturbance among children were usually those about which the mind of the ordinary mother was most preoccupied. When a whole household was openly distressed by some abnormality of behaviour the child quickly caught the feeling and himself became anxious and apprehensive. This applied particularly to children who suffered from persistent anorexia or enuresis, whose mothers were usually found to be despondent and pessimistic. Timidity and foolhardiness likewise depended very largely upon the mother's attitude. Negativism in the child was usually found when there were frequent and repeated attempts at control with constant failure to achieve it. Children responded to the moods of their parents in a remarkable way. When the mother had lost her peace of mind, refusal to sleep, refusal of food, or refusal to go to school became formidable difficulties. Refusal of food was often the response of the restless child to the excessive urging of the mother. Amongst the poor one often encountered the opposite fault. Here the price of food being an important consideration, it was apt to be doled out grudgingly with comments upon the child's appetite, and the child responded to the stimulus by becoming a prodigious eater. Similarly, of eight cases which had been brought to him for insatiable thirst, only one had diabetes. In the other seven the demand for fluid grew as a result of the obvious reluctance with which it was conceded. He illustrated these points by means of several illuminating cases. Closely connected with the child's proneness to suggestion was his instinctive desire to assert himself and make himself the centre of the picture. To this end children might develop most extraordinary symptoms. He quoted instances in which the strangest abnormalities of behaviour proved to have their origin in a simple desire to create a sensation at any price. To understand the child, therefore, one must first understand the parent, and use the all-powerful influence proceeding from parent to child in the treatment of the disorder.

Dr. C. MACFIE CAMPBELL (Assoc. Prof. Psych., Johns Hopkins) remarked that Dr. Cameron had dealt in his paper mainly with the physical aspect of the nervous child. It was a fact that children of this type were often found to be suffering from some fundamental physical inferiority. It was in these cases that the psychiatrist looked for help from the physician. The psychopathologist was especially concerned with the problem of the child which was physically normal but presented abnormalities of behaviour such as pilfering, lying, and temper tantrums. It was important to realise a child as an individual personality with its own personal difficulties, and to appreciate that these might be of two kinds: Difficulty, on the one hand, of adapting to external situations; and, on the other hand, difficulty in the adjustment of the internal emotional forces to one another. Dr. Cameron had confined himself to the external difficulties, and the speaker found himself in complete agreement with what he had said about the importance of parental

management. If the nervous child were to receive adequate treatment it was frequently necessary to get the parents to readjust their own scale of ethical values. He thought that on the whole people were ready to do this if they could be convinced that the health of their children depended upon it. In the case of the nervous child the psychiatrist was, as a rule, consulted for a symptom; he found it necessary to study the whole child and that led to a study of the whole home.

Dr. HELEN BOYLE (Hove) agreed with the President's contention that neurology and psychiatry should be considered as a single field for investigation. She was especially interested in the nervous stance which Dr. Cameron had described. She asked whether this was due to a constitutional physical defect, or whether it was simply the bodily expression of an emotional attitude—a disheartened stance. She thought on the whole it was the latter, and compared what she described as the war and post-war stance of adults as indicating the natural posture of a person suffering from fatigue and depression. She had analysed her own experience in the case of 40 children and had come to the conclusion that when a child compensated for its sense of inferiority its stance improved. This was so whether the compensation was a correct one from the social standpoint or not.

Dr. W. A. POTTS (Birmingham) thought that in some of these nervous children the trouble might be due to disturbance of the endocrine balance. He had known cases in which the administration of small doses of thyroid was followed by remarkable improvement. In other cases he thought the overgrown child might have exhausted its pituitary reserves, which might perhaps be restored by means of the administration of pituitary extract. He emphasised the importance of the parental attitude, not only in its direct influence on the child but indirectly through the example. Adaptational failure in the parent often led to similar failure in the child. With regard to treatment, he laid stress upon the importance of fresh air and of proper clothing. The parents' ideal in training the child should be to watch but not let the child know that it was being watched. He considered it most important that every child should have instruction both in some simple form of religion and also in the origin of life.

Dr. H. CRICHTON MILLER (London) regretted that Dr. Cameron had not gone more deeply into the question of ætiology of the amyotonia in these children. It was in matters such as this that the psychiatrist looked for help from the physician. He suggested that the cause might be a defect in the calcium metabolism associated perhaps with parathyroid deficiency. The problem child, however, was often physically fit. In the course of progressive adaptation the child depended to some extent upon the stimulus of social opinion. The only child, being sheltered from the world, lacked the stimulus to deal with its own difficulties. With regard to the treatment of delinquents, he pointed out that a child will often prefer to be punished as a criminal rather than be ignored as a mediocrity. In the treatment of many of these conditions it was most necessary to switch off the limelight. A common problem of childhood about which medical men were consulted was enuresis. This was the supreme example of the infantile state and was a symptom of failure of progressive adaptation. There was a danger lest the child who was threatened with the social consequences of this habit might develop a revenge motive towards society, in its desire to secure compensation for being treated as an outcast. Hence the association with enuresis of habits such as wilful stealing and lying.

Sir ROBERT ARMSTRONG-JONES (London) referred to the existence of a National Society for the Education of Parents which was doing good work. He maintained the importance of the maxim "Don't say 'Don't.'" One should reason with the child, and lead rather than force. In training, the principle of retributive justice should be adhered to. He considered that a full allowance of sleep was of the greatest importance to children. A child of the nervous type should get at least 12 hours nocturnal rest, if not sleep, up to the age of 15. He wondered whether some of the moral imbecility seen in later years was not a product of the nervous child badly handled. He emphasised the importance of teaching children harmony of movement.

Dr. R. G. GORDON (Bath) asked what lay behind the desire to attract, the negativism, and other trends of the nervous child. Was it a matter of predisposition? McDougall regarded certain instinctive dispositions as fundamental and considered character as formed by environmental influences acting upon these factors. In the nervous child one or more of these instinctive dispositions might be over-stressed. He brought forward evidence to show that despite McDougall's theory a given set of instinctive dispositions did not always lead to the development of the same quality of character. Nervousness in the child expressed a failure of integration. In view of Bianchi's work, this failure might be correlated with a failure of development of the frontal lobes. He thought that analytic methods in young children were not likely to be successful because the child was incapable of understanding the treatment.

Dr. G. F. HARFORD (London) referred to the importance of squint in relation to nervousness in children. He referred also to a resolution carried at the last annual meeting of the Section to the effect that instruction in psychopathology should be included as an essential part of the medical curriculum.

Mr. W. S. INMAN (Portsmouth) referred to the frequent association of squint with left-handedness, and the association of left-handedness with stammering. He thought that the left-handed child, who remained so, was often the successful rebel against parental endeavour to compel right-handedness; whereas the unsuccessful rebel frequently became a stammerer.

Dr. L. A. PARRY (Hove) thought the nervous child was far more common to-day than 15 or 20 years ago. Dr. Cameron had given instructions for treatment; how far could the general practitioner be expected to effect a cure along these lines? He thought the percentage of parents who could be influenced was very small. He agreed with Dr. Potts as to the necessity of religious instruction. He did not think it advisable to instruct children in sex matters.

Dr. POTTS explained, in reference to Dr. Parry's remarks, that he did not consider deliberate instruction in sex matters necessary or advisable, but thought that the child's questions upon this subject should be frankly answered.

Dr. S. D. BHABHA (London) said that in the experience of his practice in East London nervousness was rare amongst Jewish children notwithstanding popular belief to the contrary.

Dr. P. MACDONALD (York) referred to the importance of postural training in the treatment of nervous disorders.

Dr. F. G. LAYTON (Walsall) referred to the difficulty of treating the nervous child in the back streets where the environment of the nursery was lacking.

Dr. A. G. WILKINS (Stafford) pleaded for better school accommodation in the future. He favoured the plan of open-air schools wherever possible.

Dr. CAMERON, in reply, again emphasised the fact that the emotional attitude of the child depended upon the emotional attitude of the mother. With regard to the ætiology of the stance of the nervous child, he thought an important point was the tendency of the child to react to any kind of illness in certain ways at different phases of its life. In infancy the digestive system was usually upset; later on locomotion and posture were thrown out of gear, whether the illness was due to a chronic infection or to a disturbance of the emotional life. He had found that class training in physical exercises had a good

effect upon the attitude of both mind and body of these children. The slum child should be treated through the mother. Once the mother's confidence in her own ability to handle the child satisfactorily had been re-established treatment was likely to be successful.

THURSDAY, JULY 26TH.

On the second day, Dr. C. M. HINDS HOWELL being in the chair, Dr. E. F. BUZZARD opened a discussion on the

Sequelæ of Encephalitis Lethargica.

Referring to the difficulty of distinguishing between the primary results and the sequelæ of the disease, he defined sequelæ for the purpose of discussion as (1) those disorders of function which appeared for the first time after the disease had spent itself, and (2) progressive alterations in defects of function which had been left as more or less permanent legacies of the disease. It was probable that our list of sequelæ, already long, would still be added to, for every function of the nervous system might be affected. Mental sequelæ were common, therefore it was a matter of practical importance to warn the relatives that even a slight attack was apt to leave the nervous system below par for many months or even years. Unless such a warning note was sounded, patients were apt to return to work before they were fit, sometimes with disastrous results. In the majority the mental symptoms did not amount to more than lack of energy, depression, and insomnia, but in some instances there occurred profound alterations in the personality. He quoted cases illustrating this point. Perhaps the worst cases of this type were seen amongst children.

Involuntary movements might occur in the acute phase of the illness or make their first appearance later. They varied from rhythmical twitchings of one or two muscles to more complicated movements involving a whole limb. Generally they did not interfere seriously with voluntary activities. He referred in detail to a case in which the involuntary movements had been extensive and severe. In this case the muscular contractions were regular and their frequency corresponded to the pulse-rate—about 72 to the minute. The general tendency was for these involuntary movements to disappear in the course of time. The Parkinsonian syndrome was one of the commonest sequelæ. It might develop early, gradually become less marked, and never progress. At the other extreme was a group of cases in which the disability steadily progressed. Respiratory disorders were not uncommon and were of great interest. Hiccough and vomiting were frequent complications, and might persist for months after the illness. Optic neuritis was not infrequently observed at the height of the disease. Foster Kennedy had drawn attention to its occasional occurrence as a late symptom in convalescence. Lethargy in some cases might be regarded as a sequela, and might occur in the form of periodic attacks with headache. The explanation was probably a mild degree of hydrocephalus.

As to the pathogenesis of sequelæ, he thought that the inflammatory changes in and around the vessels played a large part in their development. There were, however, certain other sequelæ which could hardly be attributed to vascular deficiencies. He regarded the lethargy of encephalitis as probably dependent upon mechanical interference with the drainage of cerebro-spinal fluid from the third and lateral ventricles. Possibly meningeal thickenings and loculated cysts might also account for certain of the sequelæ. We were still without any specific treatment for the disease. Perhaps some of the mental disabilities might be avoided by insisting upon an adequate convalescence. Tremor might perhaps be lessened by means of hyoscine. And in one case of Parkinsonian rigidity suppositories of belladonna had produced temporary improvement. Generally a combination of psychotherapy and physical re-education had to be the basis of treating the sequelæ.

Dr. G. RIDDOCH (London) remarked that Dr. Buzzard had confined himself to sequelæ of two kinds: permanent after-effects and subsequent results of the original illness. He proposed to deal with the subject of relapses which he believed occurred in some cases. He cited the instance of a woman who, five years after an original attack of encephalitis lethargica, which had left her with a residuary ptosis, had a definite recurrence with mental and physical symptoms. He also quoted statistics relating to cases followed up from the out-patient department at which he worked. Mental deterioration had occurred in more than half the cases, and of these a large number were among young people—children under the age of 6 being perhaps most frequently and most severely affected. He quoted instances in which outbursts of uncontrollable temper and signs of moral degradation had followed the illness. Character changes of this kind were not necessarily associated with intellectual deterioration. Cranial-nerve palsies formed a group of common sequelæ and appeared in three-fifths of the cases, the nerves most frequently affected being the third, fourth, and sixth. He had seen persistent tachycardia both in the original attacks and as a sequela; and also attacks of respiratory distress, one of which had ended fatally. Symptomatic paralysis agitans was very common in the majority of cases. It was progressive and it was often associated with cranial-nerve palsies. This syndrome was not necessarily accompanied by mental deterioration. In his experience, myoclonic movements tended to disappear if the patient did not die. Movements of the choreo-athetoid type tended to persist. Anæsthesia was a rare symptom, but pain a common sequela. In all cases he thought the prognosis must be very guarded, because the virus probably smouldered on in the tissues for some time and might flare up at any moment. In the treatment of the involuntary movements he had found hyoscine hydrobromide useful.

Dr. HINDS HOWELL referred to a series of 34 cases which had come under his personal observation in the acute stage of the disease. Of these six died and 11 made a complete recovery. Of the remainder, he had been able to follow up the majority, and had also studied a number of other cases who had first consulted him for the sequelæ of the disease. He referred to three cases which developed Parkinsonian symptoms in their original illness, but had eventually recovered completely. He thought that an accurate prognosis in the early stages was extremely difficult—if not impossible. Patients who developed the Parkinsonian syndrome early, together with ocular palsies, he thought on the whole did badly; and in general he thought a bad prognosis was justified in cases which showed signs of severe involvement of the mid-brain. Some of the Parkinsonian cases tended to become progressively worse. On the other hand, he had a patient with choreo-athetoid movements who was doing well. Personality changes, in his experience, were the commonest sequelæ, although none of his cases had needed certification. The chief symptoms were loss of emotional response and slowness of the intellectual processes. There might also be impulsive actions, and these might take a suicidal form. The mental symptoms did not tend to improve. In the Parkinsonian cases he had noticed that the tremor was much less than the rigidity, and was as a rule coarser than that of true paralysis agitans. The commonest ocular defects were loss of convergence and accommodation. Of sleep disturbances, that which he had seen most frequently was a reversal of the rhythm occurring in young children. He referred to several instances in which there had been disturbance of the respiratory rhythm. He had noticed that seborrhœic dermatitis, especially of the scalp and forehead, was exceedingly common in these patients. Amongst other symptoms he had noticed abnormal appetite and obesity following the disease. He had never seen optic neuritis, and had generally considered its presence a point against the diagnosis of encephalitis lethargica. He was therefore all the more interested in Dr. Buzzard's observations. He

thought that the frequent occurrence of rigidity as the sequel of a disease which particularly affected the mid-brain was of great interest in relation to the work of the physiologists upon decerebrate rigidity.

Dr. A. FEILING (London) confined himself to two aspects of the sequelæ in this disease: the ocular palsies and the Parkinsonian syndrome. In the first group he had found pupillary changes, such as inequality, loss of convergence and paralysis of accommodation, of common occurrence. Paresis of the extrinsic muscles was also common, unilateral or bilateral ptosis being of greatest frequency. These cases might closely simulate myasthenia gravis, for in encephalitis lethargica, as in the other disease, remissions and relapses might occur. He quoted a case in which, after an attack of encephalitis in September, 1920, a patient continued to suffer from ocular palsies, varying from time to time and from muscle to muscle over a period of 26 months. The Parkinsonian syndrome was familiar to all neurologists as a common sequel which might appear early or late in the history of the illness. He would refer to one or two points which were of use in differentiating between this and the ordinary senile form of paralysis agitans: (1) Many cases of the post-encephalitic form occurred at an age when true paralysis agitans was unknown. (2) The characteristic tremor was often lacking in the post-encephalitic form, whereas rigidity was constant. (3) Fragmentary conditions of rigidity were more commonly seen in the post-encephalitic cases. (4) Sialorrhœa also occurred more frequently as a sequela of encephalitis lethargica. In the matter of prognosis he thought that those cases in which the Parkinsonian syndrome commenced slowly after a long latent interval carried a bad prognosis, and this was especially the case in young children.

Dr. D. MCALPINE (London) presented the results of an examination of the brain in two fatal cases. In one he had found some changes in the globus pallidus in the shape of perivascular cuffing and hyaline changes in the vessels, but the main incidence of the disease was upon the mid-brain. Serial sections of this part showed perivascular cuffing and remarkable changes in the pigmented cells of the substantia nigra. The pigment had disappeared from the cells and was scattered about the section. In the second case he found hæmorrhage into the basal ganglia on the right side and calcification of several arterioles in the anterior half of the globus pallidus. There were inflammatory changes in the mid-brain, but the substantia nigra on both sides was normal. Both these cases during life had shown symptoms of paralysis agitans. Both had died with symptoms of respiratory failure, but no changes of importance were seen in the medulla. Dr. McAlpine showed on the screen lantern-slides illustrating these histological changes. He referred in some detail to the literature of the subject and to the minute changes in the walls of the vessels, which he thought began with a deposition of fatty droplets, going on later to calcification. He had found similar changes in the acute stage of the disease, and had not, so far, been able to find them in cases of other disease with the important exception of a case of senile paralysis agitans.

Dr. C. P. SYMONDS (London) emphasised the fact that the severity of the sequelæ bore no constant relation to that of the original illness. It thus happened that many of these patients sought medical advice for sequelæ in whom the true significance of the original illness had escaped notice. In these cases diagnosis must be retrospective and depended largely on the history. He quoted the case of a young woman very severely affected by the Parkinsonian syndrome, whose original illness had been so slight that she neither went to bed with it nor sought medical advice. He had seen several other cases of this ambulatory type. In the presence of the Parkinsonian syndrome the retrospective diagnosis was, as a rule, easy. In other instances it might be more difficult. He cited the case of a man complaining of lassitude and presenting signs of minute involvement of the cranial nerves. On inquiry a history was obtained of a mild attack of encephalitis three months previously. Six months after the onset of this original illness he began to develop choreo-athetoid movements. These were controlled by hyoscine and had finally disappeared. The latent interval between the original illness and the development of the Parkinsonian syndrome might in his experience be as long as three years, but in these cases the patient could never fairly be said to have made a complete recovery from the original illness. If the patient recovered his mental and physical health after an attack and maintained this recovery for six months he thought he was free from further trouble. The involuntary movements received perhaps more than a fair share of attention. He had been especially interested in complaints of visceral sensory disturbance, such as sensations of suffocation, choking, nasal obstruction, and rectal tenesmus. Some of the sniffing and gasping movements seen in these patients might be due to this cause.

Dr. C. A. MCBRIDE (London) referred to Economo's work, showing that the virus might smoulder in the disease for a long period. He would confine most of his remarks to the occurrence of involuntary movements resembling those of spasmodic torticollis, and described two cases in detail to illustrate his remarks. We had learned from encephalitis lethargica that the symptoms of paralysis agitans might have an infective origin. Might this not be equally true of spasmodic torticollis?

Dr. MORRIS remarked that he had seen cases in which affections of the skin were distressing. He instanced hyperidrosis of the hands and trophic ulcer of the heel. He had also seen involuntary gaping movements of the jaw, which were accompanied by no sense of distress, but were beyond the patient's control.

Dr. W. A. POTTS felt grateful to Dr. Buzzard for the explanation he had offered of the remarkable variations in the course of the disease, and quoted the case of a young woman who was completely stuporose one day and active on the next. As to treatment he thought that psychotherapy was certainly of value. In view of the calcification of the vessels recorded by Dr. McAlpine, had the administration of citric acid been tried? In some cases he had tried influenzal vaccines he had thought with some effect. He referred to two cases he had seen in a maternity hospital in which an erroneous diagnosis of eclampsia had been made, and in one case labour induced, in pregnant women suffering from encephalitis lethargica.

Dr. C. CHARNOCK SMITH (Hastings) referred to a case in which, on the advice of a colleague, he had injected turpentine into the leg—he was not sure whether this had been followed by beneficial results. He also mentioned the occurrence of confused mental states, especially in the evenings.

Dr. W. HARDCASTLE (Newcastle-on-Tyne) inquired as to the frequency of depression occurring as a sequel. When it did occur did it depend upon organic changes in the brain, or was it of psychogenic origin? He thought possibly that some of these cases might be helped with psycho-analysis.

Dr. DEVINE said, in relation to the statistics obtained from mental hospitals, that the psychiatrists had possibly overlooked a number of the cases in which the original illness had been of the mild or ambulatory type. He thought the correlation of the infective origin of this disease, and the nature of the mental symptoms observed, was of the greatest importance to psychiatry. Fundamentally we must conclude that all abnormalities of mental function depended upon changes of structure, however slight.

Dr. MACFIE CAMPBELL referred to the importance, from the point of view of treatment, of deciding whether symptoms were residual or whether they depended upon changes still active. Should one encourage the patient with Parkinsonian symptoms to rest or to make further efforts? He thought that further investigation of the cerebro-spinal fluid should be made in these late cases. With regard to the mental sequelæ, he had observed a marked difference

between the reaction of the child and that of the adult. The former had frequently to be admitted to a mental institution on account of his anti-social outbursts. If the adult had to be placed under care, it was rather because his apathy rendered him unfit to look after himself. What was the explanation of this discrepancy in reaction?

Dr. BUZZARD, in reply, said that as a result of the discussion we must conclude that an absolute distinction between relapses and true sequelæ was impossible. We must also remember that we knew little of the immunity conferred by an attack. Dr. Riddoch's case might have been, perhaps, an instance of two separate attacks occurring in the same person. When he referred to psychotherapy as an aid to treatment in the disease, he meant that one should ascertain what were the patient's own hopes and fears about his illness, and endeavour to allay needless anxieties. Having achieved this, one was in a much better position to carry out physio-therapy successfully. With regard to the pathological report of Dr. McAlpine, he thought that a calcified vessel, however wide its lumen, must be considered inadequate to provide a proper circulation.

FRIDAY, JULY 27TH.

At the closing session, Dr. G. RIDDOCH being in the chair, a discussion on the

Prognosis of Psychoses During Adolescence

was introduced by Dr. D. K. HENDERSON (Glasgow). In order, he said, to keep the discussion within limits, he would formulate his views as to prognosis, especially in regard to the type of mental reactions ordinarily called the dementia præcox type. Nothing was more tragic than the occurrence of mental disorder at the time of adolescence. Unfortunately disorders of conduct were often glossed over by the parents, and thus the opportunity for preventive treatment was lost.

The attitude which we adopted with regard to prognosis in general must be largely based upon the views we held concerning the mechanism of the disorder. We could either regard cases as developing upon the basis of some kind of organic visceral disease, or we could utilise the broader conception of psychobiological adjustment. Kraepelin's classification differentiating the manic-depressive and dementia præcox groups had been valuable as a stimulus to careful observation of symptoms, but in the opinion of the speaker symptoms alone were an unsafe basis for prognosis. The setting in which they occurred had also to be considered. Kraepelin's conception tended to breed pessimism in that it encouraged the idea that certain symptoms were characteristic of dementia præcox, and this carried with it a hopeless prognosis. In 1911 Bleuler had coined the term schizophrenia to include all cases except the manic-depressive group. This group of Bleuler's was a wide one, and according to his figures only 22 per cent. of the cases showed a severe degree of deterioration, but in the others there was always some residual defect. McCarthy had lately divided the cases of the dementia præcox types into two groups: (1) degenerative, and (2) non-degenerative; the latter, curable, group was subdivided according to the supposed toxic or infective factors in the ætiology. Cotton and his co-workers had been working on much the same principles, and had laid great stress upon the importance of focal infection, reporting a high percentage of recoveries as the result of treatment on these lines. He believed, however, that a wider conception was necessary. Although the possibilities of focal infection and of endocrine disturbances must be kept in mind, we must also estimate the psychic factors at their proper value, and consider the personality as a whole. The work of Freud and Jung had provided a great stimulus to research on these lines. He also wished to draw particular attention to the work of Meyer, who first emphasised the importance of considering mental illness in terms not of clean-cut groups but of reaction types. If we acted upon this conception we need not hesitate to diagnose a patient as belonging to the dementia præcox type of reaction; it did not follow necessarily that the prognosis was hopeless. He quoted in detail two cases illustrating the value of this method of approach to individual cases. One had to recognise in these cases both the constitutional defect and the good potentialities which might be developed and enable the individual to react to the illness in a satisfactory manner. Four other cases were related in which individuals showed symptoms, which might, in themselves, have been regarded as carrying a grave prognosis, but who nevertheless made good recoveries. When one considered these cases as individual problems in the light of the psychobiological conception, the recovery in each instance was intelligible. During the war he had reported a group of cases, which he termed the dementia præcox type of reaction occurring in soldiers, and pointed out that, as a rule, they reacted quickly to treatment and made good adjustments. This was due to the fact that the stress of war environment brought symptoms to the surface at an earlier period than would have occurred in civil life.

He attached great importance to occupational treatment in such cases. By this means outside interests might be so far developed that patients would learn to keep themselves in hand, and although they might not gain a complete insight into the actual nature of their illness, they might make a satisfactory social adjustment. There was no doubt, in his opinion, that if cases came under observation and treatment early the prognosis was very much better than it otherwise would be. The trend of public opinion was in that direction. More psychiatric clinics and out-patient departments were being established, and he believed that this would gradually lead to a more hopeful view in regard to the prognosis in these cases of so-called functional brain disorder.

Sir FREDERICK MOTT (London) said that although he personally had devoted more attention to the neuropathological side of the subject under discussion, he was equally interested in its psychogenic aspect. Every case was a separate biological problem, and we should avoid attempts at rigid classification. The individual constitution should be carefully considered as well as the environmental stress. There were people whom one could knock on the head, fill up with alcohol, or give them syphilis, and they would never develop insanity. There were others who would readily break down under any one of these stresses. In this connexion he referred to the work of Gordon on similar and dissimilar twins, which demonstrated conclusively the importance of the constitutional factor. He had, however, for some time been interested in atrophic changes which he had observed in the genital glands in cases of dementia præcox. He quoted the case of a young man who died in hospital a month after a gunshot wound of the brain. He had originally taken the testes from this case as part of his control material. He was surprised, however, to find atrophic changes. Inquiry showed that the death had almost certainly been due to suicide. Some time later he had the opportunity to see a brother of this man in an asylum. After his death he found exactly similar changes in the testes. He subsequently discovered that there was a sister also in an asylum, that the father had died insane, and that there was insanity also in the mother's family. Here was an example of genetic inadequacy.

The war had illustrated the importance of the environmental factor, and had brought a number of cases of potential dementia præcox to the surface. Perhaps this might have been prevented by a more careful examination of recruits. He had found in these cases of dementia præcox, in the interstitial cells of the testes, in the adrenals, and the pituitary, disorderly arrangement and deficient staining of the nuclei. He next turned his attention to the nerve cells and in cases of dementia præcox found a deficiency of chromatin. As to the treatment of these cases by sheltering them from environmental stress—was this a good thing for the race? His studies of heredity in

these cases had shown him that anticipation occurred in successive generations, and that in this way nature attempted to get rid of a defective stock.

Dr. F. E. STOKES (Portsmouth) presented statistics from the Borough Mental Hospital of Portsmouth relating to the recovery-rate in cases of adolescent insanity. These figures covered the post-war period. The male recovery-rate proved higher than the female by 10 per cent. As a fair proportion of the males were soldiers, this discrepancy appeared to be explicable in the light of the importance played by exogenous factors in precipating the disease.

Dr. DEVINE thought that psychiatrists owed a great debt to the inspiration of August Hoch. In each case it was necessary to study the individual reaction type, which was the soil upon which the psychosis grew. If we found that a psychosis had developed upon the basis of a shut-in personality as a practical matter we could be fairly sure that the prognosis was a bad one. He agreed with Dr. Henderson as to the important part played by war stress in the development of dementia præcox-like symptoms in the soldier. His experience with civilian cases had been similar. If the onset of the disease had been sudden and the precipating causes adequate the prognosis was good. He referred to the case of a young woman, whose history, so far as he could ascertain at the time, was that of a normal individual. The story of the onset was that in some amateur theatricals she had to take the part of a man. This brought to the surface a latent homosexual trend, which developed into the fantastic belief that she was a man. Here he felt that the prognosis was good, but in point of fact she became worse and had shown no signs of recovery. However, when he went deeper into the history he found that the girl had in reality been suffering from hallucinations for some years before the final collapse.

Another case to which he referred was that of an only son with a strong mother-fixation, who had failed to adapt to war stress. Judged by the symptoms, which were those of a confused dementia-præcox-like state, prognosis appeared bad. However, the patient eventually left hospital and became married to a woman much older than himself. This situation provided him with a partner who was prepared to fuss over him and demand little demonstrative affection in return, and at the same time the age of his wife was an effective barrier to the responsibilities which would have been entailed by a family. Under these circumstances he remained well.

Dr. SYMONDS, in discussing the fact that patients often fail to come within the range of proper treatment until the stage for preventive treatment is passed, agreed with Dr. Henderson that this was due largely to ignorance of the public, who either overlooked peculiarities of conduct, or took refuge in the blessed excuse of "nerves." The fault, however, was not wholly with the layman; the average medical student in his curriculum had little or no chance of gaining any practical experience of mental disorders. He therefore often went into practice feeling that the psychiatrist alone was competent to deal with such cases—hence the regrettable tendency even in the medical profession to encourage the hypothesis of "nerves."

The remedy for this defect in the system of medical education lay in the provision of observation wards for mental cases in the general teaching hospitals. The very fact of the existence of such wards would make the student realise that the treatment of mental disease was an integral part of medical practice. The student would have the opportunity of learning to handle these cases and think about them from a common-sense standpoint. The hospital patient also would be encouraged to find help for the solution of his problems outside the walls of a mental institution. These patients did in fact attend the out-patient departments of general hospitals in large numbers, but in London at any rate facilities for their treatment as in-patients was sadly lacking.

In the future treatment of these cases he felt that closer coöperation was needed between the psychiatrist and the general practitioner. This, he thought, would come when the practitioner had an opportunity of practical experience in this work as a student, and when pyschiatrists in general learned to talk about their subject as intelligibly as Dr. Henderson had done. For hospital cases much more might be done in the way of after-care by means of a properly organised social service.

Dr. J. L. JACKSON (Fareham) hoped that Dr. Henderson in his reply would say something more about the treatment of these cases. As medical superintendent of a county asylum, he himself was in charge of 1100 patients, and with a limited staff felt keenly the difficulty in providing adequate treatment. Psychiatry had tended to become divorced from general medicine, and he welcomed every opportunity of bridging this gap. He was glad that Dr. Henderson had mentioned the possibility of a social recovery as opposed to mental recovery. There was no doubt that a good many patients were able to make a more or less satisfactory adjustment to the social environment even if they lacked insight. He regarded occupational therapy as one of the most important means of treatment. At the institution where he worked he had organised games and amusement committees with most satisfactory results.

Dr. D. STONE (Northampton) referred to the large number of cases which he encountered in general practice which never came within the ken of the specialist. Unfortunately, there was no specific remedy for mental disorders. Of what value was it to consult a text-book upon, say, psychasthenia? The individual case had to be studied on its own merits. One had to find out what were the latent interests of the individual and develop them so far as possible in relation to his environment. He quoted the case of a young man who had failed to adapt himself to the requirements of business life, into which he had been launched by his parents. He had frequently expressed a desire to go to sea, which had been suppressed. Finally he was allowed to follow his own bent, went to sea on a whaler, and became an expert harpoonist of considerable renown.

Dr. H. BAIRD (Hastings) thought that it would be impracticable to undertake the treatment of mental patients in a general hospital. He considered the average duration of stay and the difficulty of caring for excited cases serious objections. The proper place for the mental patient was the local mental hospital. He thought that more use might be made of these hospitals for the purposes of teaching.

Dr. D. MATTHEW (Exeter) had been much interested in the effect of occupational therapy and exercise in preventing the development of catatonic conditions in dementia præcox cases. Other speakers had stressed the importance of the environmental factor in cases of mental disease. He thought much might be done also in some instances by means of psycho-analysis to change the patient's mental attitude.

Dr. RIDDOCH strongly supported the view that the establishment of mental observation wards in the general teaching hospitals was essential if the medical practitioner were to gain a clearer understanding of the problems of mental disease. Dr. Baird had said that provision was already made for the teaching of psychiatry at existing mental hospitals. Unfortunately the medical student, as a rule, was in the habit of regarding the demonstrations held in such hospitals rather as a spectacle in which he might take a detached interest than as an opportunity for gaining any real insight into the problems involved. If he were to learn anything of real value about these cases he must be given more responsibility and better opportunities of practical experience. As to the importance of the environmental factor, especially in the after-treatment of mental cases, how far might not the State be considered responsible for the after-care of mental patients, as well as their temporary shelter in asylums? He thought that the after-care was equally important. He was especially interested in Dr. Henderson's remarks about the

possibility of social recovery with lack of insight which he had so clearly illustrated in his cases.

Dr. HENDERSON, in his reply, said that he was encouraged to think that interest in these problems was growing. He thought the education of the student in psychiatry a matter of great importance. At Glasgow an out-patient clinic had lately been established where the student was taught to observe the social aspects of mental illness. The fault of the older psychiatric teaching had been that, although it presented the student with a vivid symptom-picture, it did not safely stress the importance of the history. In cases of mental disorder the history was just as important as in any other disease. Before considering prognosis or treatment one must know the facts.

With regard to treatment, he had been much impressed by his experience in the U.S.A. of the good results obtained by occupational therapy. This must be organised on a satisfactory basis if it were to be of any use. At the hospital where he worked he had recently succeeded in obtaining the services of an occupational instructor, and the scheme had already proved so successful that he had added to this important branch of his staff. He now had over 100 patients engaged every morning at one of four different kinds of handicraft. The result was that patients who had been in hospital for years and had sat about doing nothing were now getting satisfaction out of their work. The wards were easier to manage, and there was less demand for sedative drugs and for restraint. In allowing these patients to have in their possession tools such as might be used for weapons, one must be prepared to take reasonable risks.

He thought that mental hospitals should have the benefit of a consulting staff of medical and surgical specialists in order to preserve the perspective of the psychiatric staff and keep them in touch with the advances of general medicine. In connexion with the after-care of these patients, out-patient work had not yet been sufficiently developed. It should be possible for each one of these cases to have access in time of need to some physician upon whom he knew he could depend for sympathy and understanding.

Corrigendum.—In the report of Dr. E. P. Poulton's remarks on the relation of acidosis to rickets, at the Section of Diseases of Children (THE LANCET, August 18th, p. 361), the work carried out at Guy's Hospital was done by Drs. Osman and *Burgess*, and not as stated. We regret the error.

SUSSEX PROVIDENT SCHEME.—The question of the administration of the Sussex Provident Scheme has recently been discussed at length by the medical profession of the county. It was decided that as the scheme was supported by three parties—the subscribers, the doctors who gave their services free, and the lay representatives of the hospitals—the medical profession should be represented on the committee of the scheme and should elect their own representatives. The matter has arisen in consequence of the proposals put forward by the Royal Sussex County Hospital for the formation of a contributory arrangement to extend the facilities of the scheme by adopting a system of mass contributions of 2*d.* a week, instead of 3*d.*, from persons in receipt of less than 40*s.* a week. The majority of the hospitals consulted on the matter have accepted the proposals necessitating a change in the constitution of the executive committee to carry on the new régime. At a meeting of representatives of bodies coöperating with the scheme at Brighton on August 13th, it was decided that each hospital coöperating be asked to nominate two members for election to serve on the committee, one member, a medical man, to be nominated by the hon. medical staff of each hospital, and one member, a layman, to be nominated by the committee of management of the hospital, the subscribers to the provident scheme to elect from such nominees two medical men and two laymen. Although this was declared to have been carried unanimously, Dr. L. A. Parry, as representing 400 doctors in Sussex, said that while he could not possibly accept the resolution on behalf of the medical profession, he would do his best to get them to accept it as a compromise.

Reviews and Notices of Books.

BIOMATHEMATICS.

Being the Principles of Mathematics for Students of Biological Science. By W. M. FELDMAN, M.D., B.S. Lond., F.R.S. Edin. With an Introduction by Sir WILLIAM M. BAYLISS, D.Sc, F.R.S. London: Charles Griffin and Co. 1923. Pp. 398. 21*s.*

AN experienced reviewer of medical literature into whose hands Dr. Feldman's book came inquired whether "all medical students nowadays have to know mathematics of that kind?" If by student we are to understand those technically *in statu pupillari*, the answer is a decided negative. It will be long enough before even the simplest differential equation finds a place in a paper set for an honours M.D. Hard as are the hearts of the Board of Examiners for the Primary F.R.C.S., the calculation of the effective component of the biceps will never reduce still further the attenuated ranks of those who satisfy the Board. But if by student we mean someone verily *studiosus*, a seeker of knowledge rather than diplomas, the negative is much less decided. In his introduction to Dr. Feldman's book, Sir William Bayliss indicates wide ranges of knowledge access to which is not easy to him who knows some algebra, but is impossible to any other. Turn where we will, to biochemistry, to epidemiology, to ophthalmic medicine and surgery, to general physiology, we are sooner or later confronted with the language of the mathematician; the student *must* learn the grammar of that language. But—and the distinction is a highly important one—this is not the same thing as saying that the medical student must be a mathematician. If that were essential, the outlook would be desperate, because mathematicians are certainly as rare as poets.

To one of these, Dr. Feldman's definition of mathematics as "the science and art of rapid and accurate computation"—Dr. Feldman admits it to be incomplete and might have used a stronger qualification—would be provocative of angry mirth. We shall be fortunate if once in a century one of these rare spirits, such a one as Hermann v. Helmholtz, devotes himself to the advancement of medical science. But although study of X.'s "French in three months without a master" will not turn a man into a serious rival of Anatole France, it will open to him a new world. Dr. Feldman has attempted to cut a track into a still more fascinating world, and, in our opinion, has attained a very creditable measure of success. He has several competitors, but none, except perhaps Salpeter—whose book besides being in German is too difficult for English medical students—has covered so wide a field. The amount of previous knowledge assumed is trivial, every method described is illustrated by a really interesting example and full use is made of diagrams. Anyone who has read the book carefully will not only be able to understand the language of more than nine-tenths of medico-mathematical papers, but will be in a position to continue his study of some particular branch of mathematics relevant to his own line of investigation. Dr. Feldman's sections on differentials and differential equations seem to us especially good, although the somewhat perplexing idea of partial and total differentials would have been made easier to follow with the help of a diagram, and the chapter on "Mathematical Analysis Applied to the Coördination of Experimental Results" is very helpful. The reader must of course never forget that although the successful representation of experimental results by a mathematical formula is a necessary condition of the latter's validity, it is not a sufficient condition. Observations may be, and often are, very effectively smoothed by a function which cannot possibly be regarded as the "law" of the phenomenon.

The chapter on "Biometrics" is not the best in the book; it is avowedly based upon a text-book written for students with a wider knowledge of

algebra than readers of Dr. Feldman's manual will generally command, so that undue emphasis is given to methods and results of more interest to mathematicians than to experimental workers. But this defect is the less important because Yule's treatise on statistics is available to all. Dr. Feldman richly deserves the gratitude of the medical reader, and we hope that his book will be widely studied.

INBORN ERRORS OF METABOLISM.

Second edition. By ARCHIBALD E. GARROD, K.C.M.G., D.M., LL.D., F.R.S., F.R.C.P., Regius Professor of Medicine in the University of Oxford; Consulting Physician to St. Bartholomew's Hospital and to the Hospital for Sick Children. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1923. Pp. 213. 7*s.* 6*d.*

Prof. Garrod's book is too well known to need introduction. Originally published in 1909 as the author's Croonian Lectures, delivered before the Royal College of Physicians in 1908, the volume was an immediate success, and it is quite safe to say that the second edition will have a similar popularity. The author confines himself to six "errors"—namely, albinism, alcaptonuria, cystinuria, hæmatoporphyria congenita, congenital steatorrhœa, and pentosuria. In the first chapter he deals with the chemistry of the species, pointing out that the metabolic processes are always the same for any given animal and that they always breed true except in cases showing an inborn error. He corrects the prevalent idea that if any abnormal substance is produced through a faulty metabolism, a new process is evolved to metabolise it. Study of the inborn errors of metabolism proves that this is not the case, since the abnormal substance is excreted unchanged. Alcaptonuria and cystinuria are examples of this. The second chapter is devoted to a statistical study of the rate of incidence of these rare diseases. The chapters dealing with hæmatoporphyria and steatorrhœa are entirely new; these two congenital diseases, although rare, are none the less interesting. The other chapters have been extended and brought up to date.

Throughout the book the author develops the idea that all the inborn errors have a common basis in their ætiology—namely, the lack of some ferment which is present in the normal body. Research in metabolism has shown that each step in the utilisation of substances such as proteins, fats, or carbohydrates is accomplished in stages, with an enzyme responsible for each chemical reaction involved. In some cases the enzyme is non-specific, acting equally well for, let us say, the oxidation of one oxy acid as another, but in the majority of reactions it becomes apparent that the ferments are specific to each. Prof. Gowland Hopkins's work on glutathione demonstrates very beautifully the importance of these tissue enzymes. All the inborn errors of metabolism can be explained on the assumption that some particular enzyme which normally destroys the abnormal substance in question is lacking in that particular patient. All workers appear to be agreed that cystinuria and alcaptonuria are due to the lack of the specific ferment responsible for the oxidation of these substances, but in the case of albinism there seems to be some difference in opinion. Thus Karl Pearson, Nettleship, and Usher suggest that melanin may not reach the pigment cells or that they have lost the power of storing the pigment. But, as Prof. Garrod points out, what is more likely than that this lack of the power of storing melanin is passed on by the gametes through the medium of the absence of a ferment. Moreover, the experimental work of Bloch and others demonstrates clearly that the absence of an enzyme is the best explanation of albinism. The inclusion of congenital steatorrhœa as one of the inborn errors of metabolism will occasion some surprise. Somehow or other one has not been in the habit of regarding this rare disease as belonging to this category, yet after reading the author's account of it one feels that it is quite just. Congenital steatorrhœa possesses all the essential attributes of an inborn error. The author allots the blame to the pancreas, attributing the disease to the lack of some unknown enzyme of the pancreatic juice which is essential to the digestion and absorption of fats. No substantial evidence of pancreatic disease in this condition has yet been obtained, but Prof. Garrod's explanation fits the facts very nicely.

The volume is written in a lucid manner and, unlike most treatises on metabolism, can be read and understood by most of us. Though the diseases described are so rare that they do not enter into practical medicine, the book will be read by the student of metabolism because of the light these pathological processes throw on normal metabolism, and by the medical man, because of the fascinating way in which the author deals with his subject.

THE DEBT OF MEDICINE TO THE FINE ARTS.

By J. A. NIXON, C.M.G., M.D. Cantab., F.R.C.P. Bristol: J. W. Arrowsmith. 1923. Pp. 29. 2*s.* 6*d.*

THIS little book is a reprint of the presidential address delivered last autumn at the opening of the fiftieth session of the Bristol Medico-Chirurgical Society. In it Dr. Nixon records in a pleasant fashion the many debts which medicine owes to the fine arts from the times of ancient Greece downwards. His argument is that the artistic sense is an aid to medicine, not only directly, as in the case of the beautiful anatomical studies of Leonardo and in Caspar's plates to Vesalius's anatomy, but also indirectly, as, for instance, that Hippocrates was inspired to draw his effective pictures of diseased conditions by the artistic sense of the age in which he lived. For a man to be able to put down upon paper an accurate picture of what he sees means that he can memorise or have a mental image of what he sees, and he quotes Paget, himself no mean draughtsman, who says of the power of drawing, "It helped to enable me to look and see more in things than some could see." We rather wonder that Dr. Nixon did not mention three medical men who made a reputation as artists, two of whom are dead—namely, Prescott Hewitt and Seymour Haden—and one alive, Henry Tonks.

EFFECTS OF LIGHT ON LIFE.

Grundzüge der Lichtbiologie und Lichtpathologie. By Prof. WALTHER HAUSMANN. (Eighth supplementary volume to "Strahlentherapie.") Berlin and Vienna: Urban and Schwarzenberg. 1923. Pp. 230. 15 pre-war marks.

Prof. Hausmann brings together, within the compass of a book of 230 pages, all that is known regarding the influence of light upon living organisms. Such a book gains much in value when, as in this case, the author is one of those who have contributed materially to our knowledge of the matters of which it treats. Prof. Hausmann's attitude is judicial throughout the work, and the many difficulties met with in the interpretation of the results of observation and experiment are by no means minimised. Sometimes, indeed, we may even feel that his caution is excessive.

Of the 12 chapters into which the book is divided, the first nine treat of the physiological aspects of the subject; the relations of photochemistry to photobiology; the general effects of light upon living organisms, and its more special influence upon the growth and movements of plants and animals. The action of light upon the superficial and deep tissues of man and the higher animals is discussed, and the part played by surface pigmentation in protecting the underlying structures. The chapters which deal with the production of disease by light are of special interest. In normal organisms these effects are very limited, but certain chemical substances, and especially fluorescent pigments, have the property of rendering the tissues highly photo-sensitive. Thus eosine administered for considerable periods for the treatment of epilepsy is capable, as Prime has shown, of rendering

a patient subject to grave lesions of the skin and nails when he is exposed to bright sunlight; and domesticated animals which have been fed upon vegetable foods containing exogenous sensitising agents, such as buckwheat or Swedish clover, are liable to develop lesions of the skin and hoofs, and the diseases so induced are not infrequently fatal. Only unpigmented animals suffer severely, but piebald animals develop an affection of the skin of the unpigmented areas of skin.

The only disease known to result from the presence in the tissues of an endogenous photo-sensitising agent is hydroa vacciniforme, which is, in not a few cases, associated with porphyrinuria, and especially with congenital porphyrinuria. It was the author himself who showed that hæmatoporphyrin has a powerful photo-sensitising action upon lowly forms of life, and also upon white mice. After injection of hæmatoporphyrin the mice die quickly if exposed to bright light; in subdued light they develop a chronic light disease, whereas if kept in the dark they do not suffer any harm. Prof. Hausmann gives an excellent discussion of this subject, and of certain difficulties which it presents. Other human maladies in which light is apparently an exciting or modifying cause, but in which the photo-sensitising agent is unknown, are also discussed. A chapter is devoted to the fatal effects of light upon sensitive animal and vegetable organisms, and the concluding chapter of the book deals with the therapeutic action of light upon tuberculous lesions.

In compiling this book Prof. Hausmann has done a great service to physiologists and pathologists alike.

MICRO-BIOLOGY.

Handbuch der mikrobiologischen Technik. Band I., 2 Hälfte. 3 und 4 Abteilung.: Nährboden und Züchtung. By Prof. Dr. RUDOLF KRAUS, Direktor des Serotherapeutischen Institutes in Butantan-San Paolo (Brasilien), und Prof. Dr. PAUL UHLENHUTH, Geh. Rat., Direktor des Institutes für Experiment. Therapie Emil v. Behring in Marburg a.d. Lahn. Berlin u. Wien: Urban und Schwarzenberg. 1923. Pp. 535–817.

THE two sections which are here under consideration constitute the second part of the first volume of this book, which will be complete in two volumes. The present part has been written in seven chapters by different well-known authors: E. Gildermeister, W. Nöller, W. v. Drigalski, R. Doerr, E. Ungermann, E. Küster, M. Neisser, and K. Beckey, each of whom provides a separate part. The whole work is, no doubt, intended to provide an up-to-date treatise comparable to the second and third volumes of Kolle and Wassermann's handbook. The text, if not quite so comprehensive, is, on the whole, more readable, and appears to have been more critically compiled than in the latter exhaustive work. Sections 3 and 4 treat of the more generally applicable kinds of culture-media and the technique of aerobic methods. Anaerobic technique and some special methods of culture will, no doubt, find place in the second volume. Several of the procedures for renovating used culture-media, which came into use during the war for the sake of economy, are given in detail. The technique for the cultivation of protozoa is well dealt with in nearly 40 pages by Nöller. The complete work promises to be a most useful book of reference. A list of the authors quoted is given at the end of each article, including the full titles of the papers.

HANDBOOK OF PHYSIOLOGY.

Sixteenth edition. By W. D. HALLIBURTON, M.D., LL.D., F.R.C.P., F.R.S., Professor of Physiology, King's College, London. London: John Murray. 1923. Pp. 968. 21*s*.

THERE is certainly no living British physiologist to whom this book was not familiar (either under its present title or as Kirkes's Handbook) as an established text-book in his earlier student days, and Mascagni's anxious figure displaying his lymphatics (now Fig. 194), or Bourgery's contemplative fellow showing his cerebro-spinal axis (Fig. 160) draw forth a sigh as we recall the time when we first bent over them. Although for three-quarters of a century this, our first guide, and best of students' text-books, has appeared in edition after edition, each has been better than the last. The present editor has himself seen through the press 16 out of the 28 editions since the book appeared in 1848, and will, we hope, give us more, for the improvements in the present edition are such as to bring the book right up to date and ensure its continued popularity. One pleasing addition to a book which has given shelter to many a passing theory in the course of the wonderful development which physiology has undergone, is the inclusion of portraits of some great physiologists of the past, two of whom, Ludwig and Claude Bernard, were still living in the early days of Kirkes's Handbook.

Excellent balance is maintained in this book between histological, chemical, and experimental physiology, and in these days of specialisation the student can still obtain a proper perspective from the reading of it to counteract, if need be, the oral instruction which they receive. We believe that this book which already extends a respectable distance into the past of British physiology will continue its advance, abreast of the subject, well into the future.

JOURNALS.

QUARTERLY JOURNAL OF MEDICINE.—The July number contains the following articles: The Fixation of the Kidney, by A. H. Southam. The investigation described in this thesis was undertaken with a view of throwing further light upon the causation of displacements of the kidney. The perirenal fascia was studied by means of sections of the trunk of six fœtuses and seven adult bodies. Plaster casts of the renal fossæ were taken in other cases. The nature of the perirenal tissue was determined by histological sections. A complete fascial sheath was convincingly demonstrated enclosing the kidney, suprarenal and perirenal fat, and attached to the diaphragm, vertebræ, and transverse fascia. The pararenal fat lies behind this fascia, and is probably the site of origin of a perinephric abscess. The perirenal fascia is the greatest factor in maintaining the position of the kidney, for all its other attachments can be divided without affecting the mobility of the organ to any material degree. The perirenal fat is not of great importance, but it serves chiefly as a protection from injury. Little fat is present in young children. The intra-abdominal pressure is the second most important factor in the maintenance of the kidney in position. Movable kidney is much more common in women; this is due to the widening of the pelvis, which causes an alteration in the shape of the renal fossa. In the male the renal fossa is pear-shaped and narrow at its lower end, but in the female it is cylindrical and widens below. Additional factors in women are lack of muscle tone and the effects of pregnancy. The article is illustrated by three plates, which show clearly the various points made by the author.—Endocarditis Lenta (Chronic Ulcerative Endocarditis): A Note on Thirty Cases seen in Civil Practice since the War, by Carey F. Coombs. The most striking features in this series of cases are the high sex-incidence in the male, the frequency with which the aortic valves alone are affected, and the fact that the men attacked were, with one exception, of fine physique, good previous health, and had all undergone hard and prolonged war service. The author considers that there is evidence that fatigue is the most constant causal factor, and it is possible that the production of lactic acid in the muscles may increase the rate of growth of organisms of low virulence. This is in accordance with Walker Hall's recent bacteriological investigations. A plate is included showing the lesions as they affect the aortic valve.—A Clinical Investigation into the Relationship of the Fat-Soluble "A" Vitamin to the Ætiology of Rickets,

by Douglas Galbraith. Another blow is here dealt at the vitamin theory of rickets. The investigation is clinical, children and not animals being studied. Severe rickets was found to occur in Glasgow in children with normal amounts of fat in their dietary, and the percentage of rickets in summer and in winter was lower in those on a fat-poor than in those on a fat-rich diet. In the summer spontaneous healing was seen, even when the children were fed upon a fat-poor diet. In the winter violet rays and massage proved the most successful therapeutic agents. The X-ray appearances of the bones in varying stages are well seen in the plates accompanying the article.—On the Phosphorus and Calcium of the Blood in Renal Disease, by O. L. V. de Wesselow. The inorganic constituents of the blood in renal disease were estimated, with a view to correlating changes in their amounts with variations in clinical symptoms. Seventy-four patients were investigated, including cases of nephritis, albuminuria of pregnancy, and a few of surgical affections of the urinary tract and cardio-vascular disease. The conclusions arrived at are that in cases of nephritis in which the prognosis is grave there is a marked retention of phosphates, and on the whole phosphate and urea excretion run parallel. The calcium content of the serum varies inversely with the phosphates, and a low calcium blood figure seems to be associated with the local muscular twitching in the late stages of uræmia.—A Comparative Study of Basal Metabolism in Normal Men, by Frederick Greig Hobson. There are many fundamental factors which influence the basal metabolic-rate, and the author has endeavoured to determine their relative importance in order to establish a normal base line for metabolism. The factor which varies most in the different methods for estimating basal metabolism is body size, as this has been calculated according to different formulæ. The author, as the result of observations on a large number of healthy individuals, considers that Dreyer's formula, using the calculated body weight instead of the observed body weight, gives very satisfactory results. The Benedict clinical calorimeter was used throughout, and certain defects are noted, and the methods adopted for their correction are described.—Critical Review. Jaundice: A Review of Recent Work, by J. W. McNee. This article opens with a reference to the important advances which have been made during the last ten years in America, France, Germany, and Holland, and which have revolutionised our views on the pathology of jaundice. A diagrammatic representation of a liver lobule is given as a basis for the new theory of jaundice which is detailed. The importance of Aschoff's "reticulo-endothelial system" is outlined, and the advances made possible by the van den Bergh test are described. For clinical instruction jaundice is classified as follows: (1) Obstructive hepatic, (2) toxic and infective hepatic, and (3) hæmolytic. In addition to an account of the technique employed in the van den Bergh test the article closes with a note on the "dissociated jaundice" of the French observers, in which it is claimed that in certain cases of hepatic disorders bilirubin alone may be retained in or reabsorbed into the blood, while the bile salts are excreted normally, or the reverse process may occur.

BRITISH JOURNAL OF OPHTHALMOLOGY. July and August, 1923.—In the July issue J. B. Lawford and Humphrey Neame write on Binocular Choroidal Tuberculosis with Detachment of the Retina in two kittens, recording a probably unique observation. The kittens were of the same litter. In one case the presence of the tubercle bacillus was demonstrated in the affected choroid of one eye. In the other it was demonstrated not only in the eye but in various other organs and inoculation of a guinea-pig gave a positive result.—R. R. James has unearthed various cases of ophthalmological interest from the post-mortem records of St. George's Hospital.—A paper by the late Charles Killick tabulates 100 cases of cataract removed under a conjunctival bridge.——The August issue contains, besides an appreciation of the late George Critchett (1817–1882) in the "British Masters of Ophthalmology" series, by A. Maitland Ramsay, a paper by Miss Ida C. Mann on the Embryology of Congenital Crescents. These may occur in any part of the disc margin, but two-thirds of them are found below the disc and only a small proportion on the outer side, a fact which differentiates them from the acquired crescents of myopia. In the common form of congenital crescent the retinal pigment epithelium and also the nuclear layers have failed to reach the lower end of the nerve, so that a small area devoid of every layer except nerve-fibres is interpolated between the lower edge of the disc and the true lower edge of the nerve. The embryological cause of this is a slightly abnormal development of the choroidal fissure. This is explained by reference to the embryology of birds.—Also a communication (received through the Ministry of Health) from Gordon Norrie, who is doctor to the Copenhagen Royal Blind Institute, in which practically all blind children in Denmark are educated. Since 1900 it has been compulsory for every midwife to instil a solution of nitrate of silver, 1 : 150, into the eyes of the infant after birth. The result has been that blindness from ophthalmia neonatorum is almost eliminated in Denmark.

AMERICAN JOURNAL OF OPHTHALMOLOGY. May and June, 1923.—In the May issue: Iridotasis Operation for Glaucoma, by M. Goldenburg. This is the description of an operation similar to that of Colonel Herbert for effecting drainage by the inclusion of the iris in the scar. The author has practised the operation for five years with success.—N. Yoshida, of Japan, reports a case of acute glaucoma following Heine's cyclodialysis, an operation devised, but hardly practised in this country, for the cure of chronic glaucoma.—J. M. Thorington, by means of a single letter, a V, and a movable screen, claims to have devised a test for visual acuity superior to the ordinary test cards.—A. E. Foster reviews the literature of corneal grafting and adds some original experiments on cats, from which he concludes that a flap of the entire thickness of the cornea can be removed and replaced with an entirely satisfactory result, but that a transplantation from another species is a biologic impossibility.—In a statistical study of ophthalmia neonatorum in Philadelphia, L. Lehrfeld states that one instillation of any prophylactic is not a positive protection against the disease, and that a large proportion of the new-born do not receive any prophylactic at all. Blindness from this cause has not been materially reduced by the present methods of prevention, he says, and he advocates more stringent measures, including the use of argyrol in 25 per cent. solution on three successive days.——In the June issue H. D. Lamb reports two cases of ruptured choroid, illustrated by a plate. One of them is of unusual extent and shape.—C. E. Farree and G. Rand contribute a paper showing the influence of illumination on the size and form of the colour fields. The charts show how little dependence can be placed on breadth or shape of field and order of ranking as to breadth, either in diagnosis or in checking up the advance or recession of a pathologic condition, unless greater precautions are taken for the control of the intensity of the stimulus light than are possible in the conditions which ordinarily prevail in office and clinic work.—Two articles give instances of focal infection from teeth and tonsils. The first, by Clarence P. Jones, relates a very unusual case of interstitial keratitis, apparently of the typical syphilitic variety, but in which syphilis was excluded. It began to clear up at once on the removal of nine teeth with apical abscesses and also infected tonsils. The second article, by John Dunn, gives further instances of various ocular conditions due to focal infection. In two of them the removal of an old blind eye proved an effective remedy.—Of the remaining articles the most important is one by W. H. Nardin and R. S. Cunningham on familial retino-cerebral degeneration, which was annotated in our issue of August 18th.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 1, 1923.

POST-HOLIDAY LASSITUDE.

THAT it is not unusual for the worker of the modern city type to return from a long-expected holiday feeling rather more tired and worn-out than when he started is a matter of sufficiently common experience to have rendered it almost a truism that it requires a week to recover from a holiday. The point was well illustrated some time ago by Mr. HASELDEN in one of his trenchant cartoons, where he depicted the holiday-maker back from a period of unaccustomed swimming, tennis, and long tramps, wondering why he failed to feel recuperated. The cartoon served as an apt illustration of one aspect of the puzzling problem, what constitutes "form" and its absence. Apart from the body of purely empirical knowledge accumulated by generation upon generation of trainers both of men and of animals, there has, up to the present, been a very meagre understanding of the factors which go to make up this condition of "form." It is common knowledge that an amount of exercise which, indulged in immediately after a long period of sedentary existence, will produce nothing but exhaustion with its deleterious results, may be accomplished readily and easily, leaving its performer fitter than before, if led up to by a period of gradually increasing daily exercise. The application of this knowledge constitutes "training."

The factors underlying the acquisition of form—improvement in coördination, hypertrophy of muscles, speeding-up of the mechanism for the removal of metabolites—are not altogether unknown. Little attention has, however, been paid to the why and wherefore of the deleterious effects of heavy and unaccustomed exercise in untrained individuals. Some light is thrown upon this subject by observations recently made by an American worker, Dr. G. O. BROUN.[1] Using dogs as his subjects, this observer has obtained evidence to the effect that several days of hard muscular effort, following upon months of sedentary life, result in a pronounced destruction of the red cells of the blood; similar effort indulged in by animals which had been leading an open-air life with plenty of exercise, on the other hand, had no such effect. The dogs used in the experiments had been kept caged for several months, the cage in this instance serving as an excellent representation of the office of the city worker. They had been fed upon a "generous mixed diet containing considerable meat," in which again the parallelism with the conditions of the city worker is very evident. They were then exercised for several successive days upon a treadmill, the exercise being conducted for four hours daily, in spells of two hours with an interval of one hour. During one day's exercise they averaged a journey of about four miles at an inclination of 20°, or the equivalent to an ascent of something over a mile. It is recorded that in the early days of the experiment the dogs appeared very tired, but that by the end they showed all the signs of thorough enjoyment. Examinations of the blood as to the total volume of corpuscles by the hæmatocrit method and of the plasma by the vital-red procedure were made at frequent intervals before, during, and after the period of exercise. The findings showed a remarkable conformity; in every instance there was a marked decrease in the total corpuscular volume with a less marked increase in the plasma volume. After an average of a week's exercise, Dr. BROUN found that it took from one to three weeks for the corpuscular volume to return to its previous level. Interest centres on the reduction of the corpuscular volume, which in one case was as great as from 101 to 62 per cent. of the normal average. The author can find no explanation of his observed facts other than a considerable destruction of red cells. How this destruction is brought about is not evident, but it is suggested by Dr. BROUN that it is due to the mechanical injury of the red cells by the violently contracting muscles. One of the factors of training would appear to be the education of the hæmatopoietic system to replace the destroyed elements; in the untrained animal the response of new blood formation appears to be delayed, in this respect resembling the behaviour after hæmorrhage in a normal animal.

Hints of some such phenomenon of blood destruction accompanying unaccustomed exercise have been conveyed by previous observations; for instance, FEIGL[2] was able to demonstrate traces of hæmoglobin and hæmatin in the serum and urine of untrained soldiers after hard marching; but the present observations are up to now the clearest and most convincing on the subject. There has always been a tendency to look upon post-holiday lassitude as a purely psychic affair. It is worthy of note that the lassitude may have a physiological basis.

[1] Blood Destruction After Exercise. Studies from the Rockefeller Institute for Medical Research. Reprints, vol. xlv., i. and ii., 7 and 27.

DIVERTICULUM OF THE BLADDER.

DIVERTICULA of the urinary bladder, as distinct from the multiple sacculations seen in cases of urethral obstruction, are comparatively rarely met with. For this reason little general attention has been paid to them. This is the more unfortunate in that proper treatment is able to effect a complete cure of the symptoms which arise from them, whilst neglect is invariably followed by urinary troubles which are bound to lead eventually to the death of the patient, though the end may be delayed by years of ill-health and intermittent suffering. Mr. J. SWIFT JOLY, elsewhere in this issue, relates his experience of this condition. He has treated 14 cases by various methods, and has been able to trace the subsequent history of the majority of them. A perusal of his paper shows how many years it takes a urinary surgeon to acquire what, in comparison with many other diseases, must be considered a very moderate experience. The full description of his cases, therefore, together with the conclusions at which he has arrived, form a very valuable contribution to the subject, and will doubtless serve as a guide to other surgeons who have only had the opportunity of dealing with an occasional case. In a recent review[3] of this disease, Mr. W. GIRLING BALL relates the successful cure of two men by excision of the diverticulum, and gives a good account of views which have been held of the pathology of offsets from the bladder cavity.

The balance of evidence seems to be in favour of a congenital origin for these diverticula, very probably an abnormal budding out of the embryonic ureter. Curiously enough, they do not as a rule give rise to trouble until after the age 40, and the symptoms which call attention to them are then usually those of infection. The seriousness of the situation lies in the

[2] Biochem. Zeitschr., 1916, lxxvi., 88.
[3] St. Bartholomew's Hospital Reports, vol. lvi., part 2.

inability of the diverticulum to evacuate its contents. Once implanted there the infection proceeds almost unchecked in the stagnant contents. Not only has the wall of the recess but little muscular tissue in it so that collapse can only be brought about by increased general abdominal pressure, but when the bladder contracts it tends to close the communicating aperture, so shutting off the diverticular contents during micturition. This explains why, after the passage of a quantity of relatively clear urine, a patient, within a few minutes, may pass a volume of most offensive water. The diagnosis suspected from such symptoms as this is confirmed by cystoscopy or cystography. Of these the latter is the more certain, for whilst during the routine cystoscopy of a number of urinary cases diverticula will be seen from time to time, this form of examination may be very unsatisfactory in advanced cases of the disease. The true bladder cavity may be so contracted that there is no room for proper manipulation of the cystoscope; it may be almost impossible with the utmost patience to obtain a clear viewing medium, or the cystoscope may pass straight into the diverticulum so that a most perplexing picture is presented to the cystoscopist's astonished gaze. Cystography, on the other hand, will almost always reveal the presence of a diverticulum, though lateral or oblique views may be necessary.

In the treatment of vesical diverticula nothing short of radical removal of the sac is effective. Mr. JOLY warns against preliminary suprapubic cystotomy with a view to combating infection. It makes matters rather worse, owing to the occlusion of the communicating aperture by the contracted bladder referred to above. If the renal function is so much damaged that any considerable operation is contra-indicated, not only must the bladder be drained, but two small tubes should be introduced into the diverticulum for irrigation purposes. Extravesical preliminary drainage of the septic sac renders subsequent removal, in the best of circumstances, a difficult operation, a still more troublesome procedure. Mr. JOLY has tried all the recognised methods of excision, except that by which the diverticulum is reached by the sacral route. He favours, where possible, extra-peritoneal suprapubic excision. His advice when the serious problem of a coexisting prostatic obstruction confronts the surgeon is to remove, if possible, the prostate at the same time as the diverticulum. If the condition of the patient will not allow of this, the diverticulum should be removed first, and the prostate after a lapse of one or two weeks. The results of operation upon these cases depend upon the degree of infection already present, or, more accurately, whether a serious extension to the kidneys has taken place. When these organs are but little affected the results are excellent. The recognition of this fact raises the question of the advisability of removal of a diverticulum which may be discovered accidentally during a cystoscopy for some other urinary lesion. Such a measure may reasonably be held to be justifiable in view of the very serious consequences which ensue when infection takes place.

OPERATIONS ON THE CARDIAC NERVES IN ANGINA PECTORIS.

APART from the nerve ganglia which lie in the heart itself, there are two sets of nerves supplying the heart—namely, the sympathetic from the cervical ganglia and branches from the vagus. Recently attempts have been made to influence the pain in angina pectoris by operations on both these sets. Prof. FRITZ BRÜNIG,[1] of Berlin, reports the work hitherto undertaken in this direction. Experimental physiology teaches us that the accelerator fibres to the heart pass in the sympathetic, whereas the depressor fibres run in the vagus, but, as Dr. BRÜNIG points out, these facts have been deduced from observations on animals, and recent advances in our knowledge have shown that there are often great differences between the vegetative functions in man and in animals, and therefore any such analogies must be accepted with caution. The fact that many heart conditions, especially angina pectoris, cause such great pain leads us to the conclusion that the nerves to the heart contain not only efferent but also afferent fibres, which bring the pain into consciousness. In 1899 FRANK had the idea of resecting the cervical sympathetic and its ganglia to combat the pain in angina pectoris, and in 1916 JONESCU carried out the operation in one case. In 1922 he and TUFFIER both reported a further successful case. In January, 1923, Dr. BRÜNIG extirpated the left cervical sympathetic with good results, while in the beginning of this year PLETH and COFFEY reported four or five similar operations, with one death. The operation consists in resecting the whole of the cervical sympathetic nerve with its ganglia, including the stellate ganglion, in this respect differing from the earlier operations for Graves's disease, epilepsy, and glaucoma, which left the last-named ganglion intact. In Dr. BRÜNIG'S case he succeeded not only in permanently relieving the pain, but also in checking the attacks of rise in blood pressure (at times over 100 mm. Hg) usually associated with the disease. This is significant, as repeated attacks of constriction of the blood-vessels (the cause of the rise in blood pressure) must in the end lead to changes in the walls of the vessels, and predispose to cerebral hæmorrhage. The results of the operation are, as shown by JONESCU'S case (observed over eight years), permanent. Among the 12 cases reported there has only been one death, that of a man suffering from aortic syphilis and commencing aneurysm of the aorta. Dr. BRÜNIG has now successfully operated on a further eight cases, some for other conditions.

That the results of the operation are satisfactory is not surprising, for we know that stimulation of the sympathetic causes contraction of unstriped muscle, as well in the intestinal canal as in the blood-vessels. We know also that stimulation of the vagus has an antagonising action, but it is extremely surprising when we hear from EPPINGER and HOFER that they have achieved the same result in the same condition by division of the vagal cardiac branches. The reasoning that led them to try the operation was the conception that the pain in angina pectoris was caused by a vaso-motor contraction of the coronary arteries, which produced a dragging or irritation of the nerves surrounding the aorta, and that this stimulus was carried to the central nervous system by the cardiac branches of the vagus. Therefore, if these nerves were divided the pain would be relieved. Up to April of this year the operation has been carried out in six cases, three times unilateral and three times bilateral. All the cases were suffering from an aortalgia, as far as one can tell from the short accounts so far published, and there was no case of true vaso-motor angina pectoris among them. In five cases the attacks of pain were cured, while one died from paralysis of the vocal cords following injury to the recurrent laryngeal nerve. How is the fact to be explained that the interruption of two nerves hitherto believed to be antagonistic has the same effect in relieving the pain in angina pectoris? The suggestion that during the sympathetic operation the vagal cardiac branches are also injured is to Dr. BRÜNIG, with his technique, inconceivable; but he thinks it is possible that the vagal branches are in reality sympathetic fibres arising in the superior cervical ganglion, passing through the dense plexus between the latter and the ganglion nodosum of the

[1] Deutsche Medizinische Wochenschrift, July 20th, 1923.

vagus, and out through the cardiac branches to the heart. Division, therefore, of the latter twigs would have the same result as extirpation of the sympathetic ganglion from which they arise.

So far it has only been proved that division of the vagal branches is useful in cases of aortalgia; no cases of true angina pectoris have been so treated, nor do we know whether the attacks of rise of blood pressure would be influenced. On the contrary, if the so-called depressor nerve has identically the same function in man as it is known to have in animals—namely, to cause, on stimulation, a fall of blood pressure—it might be very risky to divide it on both sides, thereby cutting off a valuable safety-valve for the heart. The indication, therefore, for the vagus operation is very limited as compared with the sympathetic, for, first, it is only applicable to aortalgia, and, secondly, in cases of angina pectoris it may not be entirely without risk. But if it can be proved after extensive use that it still has good results, then it may be preferable, as being more conservative, and necessitating only division of a nerve as compared with resection of the whole cervical sympathetic chain. The technique of the vagus operation could, however, be simplified. HOFER traces the vagus nerve close up to the jugular foramen and then traces its branches down to the thorax, and only those which pass freely into the thorax are divided, but great difficulty must be experienced in avoiding the superior and inferior laryngeal nerves. Dr. BRÜNIG therefore suggests that the carotid sheath should be opened for a distance of about 5 cm. in its lower portion, and that the whole sheath should be removed for a similar distance, leaving the vessels and vagus nerve bare in this region. By this means all the nerves running in the sheath must be divided, including the depressor. But he maintains that the sympathetic operation is the better, both physiologically and because it has a larger field of application. The future will, however, show which is preferable. One thing is certain, that operations on the cardiac nerves will increase our knowledge of their physiology, and therapy will thereby benefit.

THE FOURTH YEAR OF THE HEALTH MINISTRY.

THE issue of the fourth annual report of the Ministry of Health, for the year ending on March 31st, 1923, coincides with the resignation of its head, on his translation from the charge of the nation's health to that of its finances. Whatever regret may be felt at the loss of Mr. NEVILLE CHAMBERLAIN almost before he had time to make the wisdom and breadth of his outlook felt in public health matters, there are compensations in the destination to which he has been called. The history of the Ministry since its foundation, and of the efforts of Mr. CHAMBERLAIN'S predecessors to cope with its problems, no less than the substance of this last report, show clearly that the work of the Ministry has been hampered throughout by lack of funds at its disposal. The new Chancellor of the Exchequer will at least have an intimate knowledge, for example, of the dire need of houses and of the steps being taken to promote and encourage building with the least possible cost to the nation. Some success has already been achieved in this direction. It is stated in the report that the amount which Parliament will be asked to vote as a grant in aid of the deficit on housing schemes is £8,710,000, nearly £1,000,000 less than in the preceding year. The provision of employment and relief of distress again have been attempted in two ways—indirectly through authorising loans to local authorities for expenditure on public works, and directly through grants for maternity and child welfare and for milk distribution. In this regard it is noted as gratifying that though the continued need for economy renders it impossible to contemplate extensions of this work on a large scale, local authorities are not only maintaining their existing services, but in many cases by more efficient administration are able to effect improvements. The position of tuberculosis schemes is not dissimilar; rigid examination of expenditure has enabled local authorities to provide at least the same amount of treatment as in the previous year, though the grants approved did not allow of important extensions. The situation is reminiscent of that of the little old woman of small means who housed her abundant progeny in a shoe and supplemented their inadequate diet with a liberal castigation. There must be a limit to the extent to which such stern methods can succeed, and we trust that the new Chancellor may see the need of allocating larger grants for health purposes. Meanwhile we welcome the new Minister of Health, Sir WILLIAM JOYNSON-HICKS, who may expect to get at least a sympathetic hearing from his colleague at the Treasury.

In bidding farewell to Mr. CHAMBERLAIN we would call attention to the succinct memorandum which has just been issued by a departmental committee appointed by him on the subject of cancer. The personnel of the committee and the terms of the memorandum will be found on p. 479 of our present issue. Its object is to summarise in non-technical terms our present knowledge with regard to the ætiology and incidence of cancer, and to offer for the consideration of local health authorities some suggestions which may be useful to them in their efforts to inform public opinion on this important subject. Of the many leaflets attempting to summarise the cancer problem which have been submitted to us this one appears the most convincing and authoritative, and it will form a classical document of the state of knowledge in 1923. Apart from the appointment of this committee, we are informed that the Minister has directed the medical intelligence service of his Department to keep in touch with developments of cancer investigation, and that researches of an epidemiological and statistical character, both at home and internationally, in regard to cancer are in progress. Full and careful consideration will, moreover, be given to any means by which it would appear that the Ministry can use the resources at its disposal to aid cancer inquiries, in coöperation with the Medical Research Council or the special cancer laboratories and research institutions. This pronouncement does no more than confirm our confidence that responsible authorities at the Ministry of Health are fully alive to the anxiety felt by the public for the keen prosecution of cancer research. In this and in the many other medical and hygienic problems which will shortly engage him we trust that the period of office of the new Minister will be a fruitful one.

JOINT ACTION AGAINST VENEREAL DISEASES.

THE National Council for Combating Venereal Diseases and the Society for the Prevention of Venereal Diseases, after each considering and unanimously accepting the Trevethin report, have decided to confer in order to determine what joint action can be taken for giving effect to the recommendations contained in the report. This conference will meet after the summer vacation. We welcome the prospect of these two societies working together for the common good, for it is the obvious duty of the medical profession to give guidance and assistance to the public in matters where medical experience counts for so much. The proposal to set up a medical tribunal, whose conclusions and recommendations could be submitted to public opinion, took shape as the result of correspondence 18 months ago between the then Minister of Health and the chairman of the Medical Consultative Committee. It must be cheering to Lord DAWSON to see the fruition of his tireless effort. With united leadership a number of urgent questions regarding venereal disease still outstanding may achieve solution without delay.

Annotations.

"Ne quid nimis."

BRITISH ASSOCIATION AT LIVERPOOL.

THE ninety-first annual meeting of the British Association for the Advancement of Science opens at Liverpool on Wednesday, Sept. 12th, when Sir Ernest Rutherford will deliver the presidential address on the Electrical Structure of Matter. On the following day Prof. G. H. Nuttall, who presides over the section of Physiology, will give an address on Symbiosis in Animals and Plants. Papers to be discussed at this section include one by Prof. J. J. R. Macleod on Insulin and its Value in Medicine, and one by Dr. F. W. Edridge-Green on the Effect of Blood in the Retina on Colour Equation. On Friday Prof. G. Elliot Smith will address a general meeting of the Association on the Study of Man. Local arrangements include excursions to places of interest and visits to works and factories. The Liverpool housing scheme will be inspected by one party and the waterworks of the town by another. Planter's margarine works, the lactose factory at Haslingden, and the Union Cold Storage Company's plant are among the industrial concerns to receive a visit. Public interest in the administration of mental hospitals is recognised in that an excursion is arranged to the County Mental Hospital at Rainhill. It is proposed, as usual, to give a series of public lectures during the meeting of the Association, in Liverpool and in surrounding towns, while four lectures will be arranged specially for young people. A scientific soirée will be held on Sunday evening, Sept. 16th. The sections will meet in the buildings of the University of Liverpool, while the reception room is in the large and centrally-situated St. George's Hall.

DUST INHALATION AND PULMONARY DISEASE.

CONSIDERABLE attention has in recent years been paid to the effect of atmospheric pollution in causing lung diseases; hence special interest attaches to an unusually complete investigation recently carried out by Dr. E. L. Middleton, one of the medical inspectors of factories. The results are reported in two documents, and the reader is, for some reason unexplained, compelled to peruse both to understand the work in its entirety; this method of presentation will, we hope, not be made a precedent. The main report [1] is one of the best dealing with occupational risk issued from the Home Office. The processes concerned are well explained and clearly illustrated, so that those unfamiliar with industrial conditions can easily understand. These conditions vary immensely; in Sheffield tenement grinding "hulls" or "wheels" still exist, hopeless places of which it has been said they were *built*, not *designed*. Their low, discoloured ceilings, with swarf from the wet grinding accumulated on floor, walls, beams, working clothes, and the men themselves; dark, even on bright sunny days; damp, always; with an entire lack of all hygienic needs for cleanliness or welfare, all call urgently for rapid elimination from modern industrial life. Fortunately different workplaces exist in such up-to-date factories as those at Falkirk, Accrington, Wolverhampton, and Birmingham. Mechanical factors concerned with danger from the sudden fracture of rapidly revolving wheels, the structure of grindstones, and methods of removing or abating the dust danger, are fully dealt with, but medical readers will rather be interested in morbidity and mortality which prevail among the men, of whom 1153 were submitted to careful medical examination.

The findings are important, even though the conditions of the inquiry forbade recourse to X ray examination or prolonged observation. They establish that diminution of chest expansion due to age is not so important as that due to dust inhalation, and that the greatest loss of expansion occurs among those most exposed to the inhalation of fine silica dust. The resulting morbidity is discussed under the headings of tuberculosis, bronchial catarrh, bronchitis and pulmonary catarrh. Definite evidence of tuberculosis was found in 7·07 per cent. of wet sandstone handgrinders (with their special exposure to silica dust), as compared with 2·76 for all other groups of men examined. Pulmonary tuberculosis associated with dust exposure was found to claim an undue proportion of its victims late in life; thus, whereas the apex of the curve for male deaths in Sheffield (not specially exposed to dust) was at age 40, that for Sheffield grinders and cutlers was about age 50. Those so affected possessed signs more or less pronounced of fibrosis of the silicotic type. Bronchial catarrh confined to the larger bronchi, on the other hand, was slightly more prevalent among glazers and dressers with considerable exposure to irritating dust having a low content of silica; indeed, the silica-stone workers were those least affected. Chronic bronchitis was found following upon established bronchial catarrh and associated in glazers and dressers with rather a different type of fibrosis from that caused by silica dust: a type which originates round the larger air-passages, in distinction to silicotic fibrosis, which originates in the alveolar areas. Pulmonary catarrh, distinguished by cough and "tightness on the chest," is described as depending on the presence of fibrosis and as being a sequela to it. It is peculiar to silicosis, and appears to have a bad prognosis.

This investigation, while it confirms the observations of others in reference to the toxic character of silica dust, is remarkable for establishing a train of clinical symptoms associated with inhalation of other dusts than silica, such as those composed of emery and other oxides of aluminium, and of carbide of silicon. Fibrosis, bronchitis, and pulmonary catarrh represent silicosis, which predisposes to tuberculosis, on the one hand, or may progress without that complication to a fatal issue. Bronchial catarrh and bronchitis with interstitial fibrosis, with no peculiar predisposition to tuberculosis, constitute a separate type of pneumonoconiosis which follows upon inhalation of irritating, but non-toxic, dusts. Fortunately for the health of the metal trade, grindstones are giving way to manufactured wheels which generate far less dust and are not composed of silica. Although more expensive to instal, they outlast the grindstones, are economical in the end, and do the work better. This change in the wheels used will probably do more in the next few years to eradicate tuberculous silicosis from the industry than any other possible preventive measure. Hence we note with gratification that the code of regulations proposed to control the industry bears far more heavily upon the users of grindstone wheels than of manufactured wheels; and also that a suggestion, which may accelerate the change, is made for granting compensation under the Workmen's Compensation (Silicosis) Act, 1918.

A careful and intensive inquiry into the amount and types of dust to which different processes give rise rounds off the investigation. The table in which the results—obtained by using Owens's dust-counter—are set forth is given as an appendix to the report, while the discussion of the results appears in the annual report.[2] Attention was paid in particular to the presence of fine particles of silica, which, on account of the physical and chemical form in which it occurs, is the prime cause of fibroid phthisis in the industries under review. The degree of danger was found to depend on the concentration of such dust in unit volume of air, but the visual appearance of the air was no criterion of the dust present. The most

[1] Report on Grinding of Metals and Cleaning of Castings and the Effects of Dust Inhalation upon the Workers. E. L. Macklin and E. L. Middleton. H.M. Stationery Office. 1923. Pp. 100. 4s.

[2] Annual Report of Chief Inspector of Factories for 1922. [Cmd. 1920.] Chapter V. E. L. Middleton. Pp. 92–105. 1923. 5s.

injurious dust is so fine that it floats in the air and is diffused far from its point of origin to become a source of danger to neighbouring workers. Evidence is adduced in favour of intermittent exposure, even though the second process followed has its own different dust risk. The efficiency of methods of dust prevention by the application of water at the grinding point, or of dust removal by localised exhaust draught, or of dust dilution by general ventilation, was estimated by dust-counts. The whole work provides a sound basis for administrative action and has added to scientific knowledge.

BRITISH JOURNAL OF ANÆSTHESIA.

WE welcome the first appearance of the *British Journal of Anæsthesia*, a publication that it is proposed to produce quarterly,[1] the contents of which are to be concerned entirely with anæsthetics and the practice of this special branch of medicine. The Editorial Board, the names of which appear on the cover, comprises representative anæsthetists from the great towns of England and Scotland. It is, however, the ambition of the promoters of the journal to make its scope Empire wide, and they hope to bring into association with themselves representatives of the British Dominions beyond the seas. The first number augurs well for the future success of the journal. It starts appropriately with an historical article from Sir D'Arcy Power, and this is followed by a long account of some clinical experimental work on the use of drugs in combination by E. P. Donovan and J. T. Gwathmey. W. J. McCardie writes on broncho-pulmonary complications following anæsthesia, J. Blomfield gives a digest of his experience of sacral analgesia, and there is an account of new anæsthetics by C. Langton Hewer and a comprehensive abstract and bibliography of current anæsthetic literature. It will be realised that the magazine is a most useful one for any practitioner much concerned with anæsthetics, and we have no doubt that if the journal goes on as it has begun it will be a valuable addition to periodic medical literature.

FREE INSULIN.

A MESSAGE from Toronto announces the free distribution of insulin to diabetics in the province of Ontario who present a certificate from their medical man that they are unable to meet the cost of the treatment. As a matter of cold argument there is doubtless much to be said on both sides of the question whether this is a sound social procedure. Doles of all kinds are objectionable. Those who have are already taxed sufficiently for the benefit of those who have not. Diabetes is not a catching disease, so that the reasons which have led to the free distribution of diphtheria antitoxin and salvarsan do not apply. Things which are to be had for nothing are generally used wastefully. The cost will rise progressively by the very success of the treatment in prolonging the lives of diabetics. Contrariwise, it is the business of the State to preserve its lives and to recognise that it is a paying proposition so to do. The public is entitled to enjoy the benefit of discoveries which have been made wholly or in part with the aid of public funds. Monopolies are held conditionally on no one being injured by their existence. Such and such are the pros and cons which are bandied about for dialectical exercise. The medical profession will recognise that they are almost wholly beside the point. The entire hospital system is a plain monument to the ideal that the sick have a call on the service of the sound, that the needy are entitled to the help of those who have what they require, and that those who are sick as well as needy are a charge upon everyone. So long as mankind clings to its immemorial axiom that life on any terms is better than no life at all, it will be unthinkable that a potent and valuable remedy should, as a piece of actual practice, be withheld from anyone merely because he has not got enough money to pay for it. The public notoriety which has been achieved for insulin makes it particularly impossible that it should be left as a class remedy. There were inhumanity and disappointment and pain enough through the period when everyone with diabetic children and friends knew all about it and very few could get it. Now that it is available in ample amounts, there ought to be no more difficulties. Whether free insulin should be supplied by some analogue of the Surgical Aid Society or by the public authorities is a minor question of technique. There is not so much difference between the two nowadays, and the State seems to be the obvious and simple medium. But the guiding principle is clear. It is the motto of Guy's Hospital—*dare quam accipere*.

[1] Published by Messrs. Sherratt and Hughes, Manchester. Annual subscription, £2 post free; single copies, 10*s*. 6*d*.

THE HISTOLOGICAL STUDY OF NEOPLASMS.

RECENT developments in the experimental study of the origin of tumour growth have in great part diverted attention from the results of the traditional lines of investigation rendered illustrious by the work of Waldeyer, Virchow, Cohnheim, and Ribbert. Dr. G. W. Nicholson's studies in tumour formation, of which No. VII.[1] has just appeared, come as a useful reminder of the prime necessity of accurate histological work as the basis of knowledge in all cellular problems. Dr. Nicholson has come to the conclusion that tumours arise in displaced or dislocated cells or cell-groups of the tissue of origin, and in Study VII. extends this conception to the heterotopic new growths in which the histological differentiation departs from that of the surrounding organ. With an extensive and exact knowledge of the literature and a skilful choice of well-executed figures the author marshals the evidence to the conclusion that the heterotopic tumours arise from normally differentiated cells by an intrinsic transformation of which there are many examples apart from tumour growth. Without abating one jot of our admiration for the author's painstaking devotion to a laborious specialty, it is permissible to venture the suggestion that the ultimate solution of the problems of neoplasia will come from a combination of the methods of descriptive and experimental pathology, rather than from their pursuit as separate disciplines.

CARDIO-VASCULAR COMPLICATIONS OF KYPHOSCOLIOSIS.

Dr. Ernest P. Boas,[2] medical director of the Montefiore Hospital for Chronic Diseases, New York, who reports an illustrative case with a review of the literature, remarks that the functional disturbances of the respiration and circulation connected with kyphoscoliosis have not received the attention to which they are entitled. Although the frequency of dyspnœa in such patients was known to Hippocrates, Bouvier in 1874 was the first to show that dilatation of the right chambers of the heart was a very frequent finding in scoliosis. The most complete investigation is to be found in a monograph published in 1899 by Bachman, based on 197 personal cases of scoliosis or kyphoscoliosis which came to autopsy, as well as 79 cases recorded in the literature. Of the total 276 cases 247, or 89·5 per cent., presented an organic lesion of the heart or pericardium, but only 13 had organic valvular defects. Among 154 cases in which the heart was examined more carefully to determine the nature of the hypertrophy or dilatation 87, or 56·4 per cent., had hypertrophy and dilatation of the right ventricle, 27, or 17·5 per cent., of the left ventricle, and 40, or 25·9 per cent., of both ventricles. Bachman also noted that displacement of the heart upward and in an opposite direction to the scoliosis was very frequent, giving rise to a tortuous and angular

[1] Guy's Hospital Reports, vol. iii., fourth series, No. 3, 1923, p. 298.

[2] American Journal of Medical Science, July, 1923.

deviation of the aorta, the large vessels, and inferior vena cava. Of 195 deaths studied by Bachman, 116, or 59·4 per cent., were due to cardiac failure and 24 to tuberculosis. The usual symptoms are dyspnœa, due at first to pulmonary atelectasis and emphysema, and later to myocardial insufficiency, cyanosis, and œdema of the legs. Attacks of palpitation and pain may occur in crises. The pulse is not infrequently rapid and may be irregular. As the myocardial insufficiency progresses, dyspnœa, cyanosis, and œdema become more marked, the liver becomes enlarged, the excretion of urine is greatly diminished, and anasarca and ascites may ensue. The prognosis in patients with kyphoscoliosis depends mainly upon the reserve power of the heart. It is unfavourable when once the signs of myocardial insufficiency are established, and the end is frequently precipitated by intercurrent pulmonary affections. Dr. Boas's patient was a woman, aged 29, in whom scoliosis was first noted at the age of 9, and had slowly and progressively become worse. For 10 years she had suffered from attacks of giddiness appearing every month, and for about five years from dyspnœa on exertion. Examination showed the case to be one of paroxysmal auricular fibrillation with symptoms of myocardial insufficiency. The issue of the case is not recorded.

LIFE ASSURANCE AND SYPHILIS.

THE bearing of syphilis upon life assurance is discussed by Dr. W. P. S. Branson in the current number of *St. Bartholomew's Hospital Reports* (vol. lvi., part 2.). Dr. Branson begins by inquiring into the incidence of syphilis among the insuring population, and comes to the conclusion that the best estimate is a figure of about 10 per cent. He then discusses the effects of syphilis as a lethal disease, and points out that it may kill as the result of (1) general paralysis of the insane, (2) aortic aneurysm, (3) gummatous disease of the cerebral vessels, (4) tabes dorsalis, (5) epithelioma of the tongue, implanted on syphilitic leucoplakia, (6) suicide. Dr. Branson admits that there are other causes—one of the most common is cardiac failure from syphilitic disease of the coronary arteries, and this probably increases the mortality amongst syphilitics to a large extent. The author next takes up the period at which syphilis produces fatal results and points out that general paralysis and aortic aneurysm cause death between 30 and 50, while tabes, when it kills, as a rule kills late in life. He is not impressed with cerebral syphilis as a cause of death, but the statistics of the American Life Offices showed that the mortality among syphilitics was very high the first six years after infection, and death was almost always due to cerebral syphilis. Dr. Branson next discusses the question as to whether treatment can cure syphilis. It is well known that syphilis has been cured by mercurial treatment as recommended by Jonathan Hutchinson, who noted the occurrence of a second primary chancre after such treatment, and cases have been described of second infections after treatment with arsenic; but it is probable that in the great majority of cases once syphilis has been contracted, whatever the treatment, it is always liable to recur. This is especially true when any secondary manifestations of disease have developed. Dr. Branson does not place extravagant confidence in a negative Wassermann result. The blood test may be negative whilst the cerebro-spinal fluid is positive, and it is no uncommon event for the blood to be negative to-day and positive in six months' time. He says, however, that he considers a positive W.R. as a bar to life insurance. While agreeing with Dr. Branson that a negative W.R. is of no value as evidence of a permanent cure of syphilis, we are not so sure that a positive W.R. should be a total bar to life assurance. In a recent case a proposer, who had been perfectly well for seven years after contracting syphilis, was found to have a positive W.R., and in his anxiety to turn it into a negative one he had no less than 20 injections of neo-salvarsan in 12 months, the W.R. continuing positive, though he himself was in good health. Dr. Branson draws up rules as to the eligibility for insurance of lives who have had syphilis, and comes to the conclusion that those who have exhibited tertiary lesions, who have Argyll Robertson pupils, or leucoplakia of the tongue are ineligible, while increased rates must be charged for those who have had secondary manifestations and have been thoroughly treated for three years or more. He considers those who have been thoroughly treated in the primary stage and can produce evidence of negative W.R. three years or more after contracting the disease may be taken at ordinary rates. Some experienced observers would not entirely exclude cases of tertiary skin lesions, as many of these cases often live to a very considerable age. But all cases, even those giving a history of a primary sore only, should, we are convinced, be rated up.

EDIBLE FUNGI.

THE latest publication of the Natural History Department of the British Museum is a Handbook of the Larger British Fungi,[1] by Mr. John Ramsbottom, M.A., F.L.S., assistant in the Department of Botany. Types have been selected for description on the ground of their economic and biological interest. In dealing with the fleshy agarics the basis of selection has been the edible or poisonous qualities of the species, the term "edible" being used simply to imply that the fungus has been eaten without ill effects. In this country only the field-mushroom (*Psalliota campestris*) and the horse-mushroom (*P. arvensis*) are commonly eaten, and for most people the cultivated variety of the field-mushroom is the only edible fungus. Mr. Ramsbottom expresses regret that this is so, for many of our common toadstools are far more delicate in flavour than either of these. This conservatism of taste is a modern failing. Classical literature contains frequent reference to various edible and poisonous fungi, and the only way in which to know whether a fungus is edible or poisonous is by being able to distinguish it in the same way as one does other edible plants and to ascertain its record. *There is*, says Mr. Ramsbottom, *no other way*; and his handbook will serve its purpose if it popularises the safe use of a number of cheap and appetising food products. The edible fungus contains roughly 2 to 5 per cent. of protein nitrogen (of which probably not more than one-third is digestible), 5 per cent. of sugars, 1 per cent. of fat, and ½ to 1½ per cent. of mineral matter. With this composition, fungi are a complete food, a fact established by the Fuegians, who live on *Cyttaria* during a large part of the year. In Central Europe, where the use of fungi as food is much more widespread, coloured wall charts are posted in the elementary schools, so that children learn from an early age the distinguishing marks of the poisonous and non-poisonous varieties.

VALUE IN DISINFECTION.

THE Brazilian National Department of Health has reprinted an article from the Boletim Sanitario, No. 2, of 1923, with the view of impressing upon medical practitioners the futility of terminal disinfection in the prophylaxis of infectious disease. The gist of this article is that chemical disinfection of premises in which infectious cases have occurred can be of little value, seeing that the micro-organisms whose destruction is desired by that procedure are in number and virulence far less dangerous than those scattered through direct human agency or by means of recently infected articles. Moreover, many of these micro-organisms escape destruction by any means of terminal disinfection, whether by formalin spray or by disinfectant solution. Finally, the point is made that the employment of terminal disinfection

[1] Printed by order of the Trustees and sold at the British Museum (Natural History), Cromwell-road, London, S.W.7. Pp. 222. 7*s*. 6*d*.

on a large scale in all civilised cities has not diminished the infectious disease rate unless other prophylactic measures were simultaneously enforced. For these reasons, and on account of the great cost of chemical disinfection, the Brazilian Department of Health recommends the substitution for terminal disinfection of the simpler and less costly procedures of soap and water, scrubbing, and prolonged isolation and airing. In the case of dirty and dilapidated premises the usual measures of renovation are needed in addition. The Department holds that the suppression of chemical disinfection will have a good effect on the conduct of ignorant people who commit every sort of hygienic indiscretion in the course of infectious disease, confident in its redemption by the miraculous properties of the disinfectant apparatus. "People, not things, are the principal means for the distribution of disease germs, and simple measures of personal cleanliness have enormous prophylactic value." We have gladly summarised the contents of this estimable bulletin, the teaching of which coincides in a remarkable way with the lesson drawn this week by Dr. K. Simpson, deputy medical officer of health for the county borough of Croydon, from the figures in regard to scarlet fever which have come under his immediate notice. Dr. Simpson regards as a worthy object of effort the creation of a healthier state of the naso-pharynx in school children. We recall attention to a recent decree of the Prussian Ministry of Health pointing attention in the same direction.

THE SEDIMENTATION RATE IN ACUTE INFECTIONS.

THE rate of sedimentation of human blood shows considerable differences under various normal and pathological conditions. Thus the rate of sedimentation of woman's blood which varies from 3–5 hours is almost twice as rapid as in the case of man's blood. On the other hand, sedimentation of the blood of the umbilical cord is extremely slow and always takes longer than 24 hours. During pregnancy an acceleration of the sedimentation rate takes place and increases as pregnancy advances until delivery. In pathological conditions the sedimentation rate is most accelerated in inflammatory and febrile processes. The sedimentation rate is determined by estimation of the time required by the corpuscles of a specimen of citrated blood to sink from a certain marked level in a test-tube to another marked level. The sedimentation of the corpuscles is delayed by removal of fibrinogen, by narcotics, or by previously heating the plasma, while the addition of gelatin or gum arabic accelerates it. Dr. Mironesco,[1] of Bucharest, has investigated the rate of sedimentation of the red corpuscles in typhus, typhoid fever, and measles with an apparatus made according to the suggestions of Fähreus and Westergren. Pipettes were used 30 cm. long and 2·5 mm. in diameter, and a solution of 3·8 per cent. sodium citrate was employed to prevent coagulation of the blood. The examination was made 1, 2, and 24 hours after the blood had been collected at a room temperature of 20–25° C. In the three diseases mentioned Dr. Mironesco was able to confirm the fact that sedimentation was accelerated in a more or less marked degree. Fluctuations in rate were most pronounced in the course of the first hour. In typhus, for example, the rate of sedimentation was between 24 and 60 mm. during the first hour. The acceleration was less marked in cases of measles in the adult, in which during the first hour there was an oscillation between 11 and 20 mm. In typhoid fever the acceleration of sedimentation was usually more marked than in measles in the adult. It was also found that fluctuations in sedimentation bearing a direct relation to the severity and course of the disease occurred not only in the same disease but also in the same patient. Thus in a case of severe typhus which ended fatally the rate of sedimentation three days before death was 55 mm. during the first hour. In this case there were 2 g. of urea per litre of blood. In another case of typhus there was an oscillation between 30 and 20 mm. during the first hour, while the blood-urea was 0·90 and 0·80 g. In a case of typhoid fever with a pronounced ataxo-adynamic condition the quantity of blood-urea was 1·50 g. and the sedimentation 25 mm. during the first hour. With improvement in the patient's condition a diminution in the blood-urea took place, and the rate of sedimentation fell to less than half during the first hour (11 mm.). Dr. Mironesco concludes that there is nothing specific in the variations in sedimentation of the red corpuscles in various acute infectious diseases, for though the rate of sedimentation is usually more rapid in typhus than in measles or than in most cases of typhoid fever, the acceleration is related not to the particular disease but to certain disturbances, especially the amount of urea in the blood.

[1] Bulletins et mémoires de la Société médicale des hôpitaux de Paris, July 5th, 1923, No. 23.

THE DECLINE OF VENEREAL DISEASE IN DENMARK.

IN connexion with the centenary celebrations of Pasteur's birthday, Prof. C. Rasch, of Copenhagen, was invited to contribute a paper on the subject of venereal disease and the campaign against it in Denmark. His small brochure, with the title "La lutte antivénérienne en Danemark," gives not only a very comprehensive review of what has been done in Denmark in the past, but it also shows what a remarkable effect modern methods of treatment have had on the incidence of syphilis in the years 1921 and 1922. With regard to the past, Denmark has certainly been a pioneer in many directions. So soon as 1672 the treatment of venereal disease by quacks was forbidden. In 1788 free hospital treatment for all cases of venereal disease was provided. As early as 1859 penalties were attached to the propagation of this disease, and ten years later its study was made compulsory for medical students. In 1874 compulsory treatment for all cases of venereal disease was introduced, and in 1900 Credé's method of dropping silver nitrate into the eyes of the new-born was made obligatory. In all these matters Denmark led the way, and in 1906 various other provisions were made for the comprehensive control of venereal disease. When Prof. Rasch was invited to give a survey of the results, up-to-date, of the venereal disease campaign, he, in coöperation with Dr. Svend Lomholt, addressed questionnaires to 130 heads of hospitals and similar institutions, and obtained information of great statistical value. It appears that the hospital accommodation in Denmark is greater than that of any other civilised country, and apart from sanatorium and asylum beds, Denmark, with a population of only 3,300,000, has about 14,300 beds, many of which are at the disposal of the subjects of venereal disease. But it seems to be rather ambulatory treatment with salvarsan and other specifics than hospital treatment that has brought the incidence of syphilis down with a run. In 1921 there were 1942 new cases of syphilis in the whole of Denmark, as compared with 1578 in 1922. The number of new cases of congenital syphilis in these two years was 142 and 95 respectively. In 1912 Dr. Lomholt investigated the number of recent cases of syphilis in Copenhagen, and he came to the conclusion that in this year there were about 1300 such cases. A comparison of these findings with those of 1922 led him to the conclusion that the incidence of syphilis had declined in this period by about 33 per cent. The evidence of these figures is supported by the impressions of most specialists with whom Dr. Lomholt has conferred, and it is noteworthy that the incidence of gonorrhœa has also shown a marked decline in the period 1910–1922. In the five-year period 1900–1904 there were 16 cases of blindness due to gonorrhœa, and in the ten-year period 1905–1914 there were only four such cases. Yet in other Continental countries about 20 per cent. of all cases of blindness are still due to gonorrhœa.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXXIV.

THE TREATMENT OF ANÆSTHETIC SICKNESS.

By anæsthetic sickness I do not here mean the persistent vomiting, a symptom of formidable post-anæsthetic toxæmia or delayed chloroform poisoning, which has definite associated symptoms. This is a comparatively rare condition and is treated on well-known lines. The condition which concerns us now is, on the contrary, very common after any anæsthetic. It is one of discomfort and even misery for the patient, but being without danger and of comparatively short duration its treatment has not received much attention. Yet the nausea and retching, even without actual vomiting, that afflict many patients during the first 24 hours after taking an anæsthetic cause so much discomfort and may so prejudice rapid recovery that they are well worth the serious attention of the practitioner. From the patient's point of view these first hours after return of consciousness are a serious affair and anything that diminishes their discomfort is very gratefully received. Moreover, if a second operation on some future occasion becomes necessary it is often the recollection of the discomforts immediately following the first that prejudice a patient against facing the ordeal once again. It is highly desirable, then, that recovery from anæsthesia should not be synonymous with temporary misery. The means to achieve this end are preventive and curative. Preventive measures are mainly in the hands of the anæsthetist, curative measures depend generally more upon the surgeon or the practitioner. It must be confessed at the start that these means in both cases depend on empirical knowledge. We are ignorant of the exact causation of the discomforts that we are trying to prevent or to cure. We do not know the physiology of post-anæsthetic vomiting. We know a good deal from many thousands of clinical observations about the likelihood of post-anæsthetic discomfort or its improbability with various types of patient, and we know similarly the harmful effects of a meal too soon before the anæsthetic or per contra of too prolonged a preliminary starvation. But in many cases we do not know whether there will or will not be symptoms needing treatment after anæsthesia. Our treatment, therefore, both preventive and curative at present depends entirely on our experience.

Preventive Treatment.

This consists in (1) the proper preparation of the patient, and (2) selection of the most appropriate anæsthetic and method of administration for the particular patient. The preparation of the patient can be so overdone as to bring about more harm than good. With the ordinary healthy adult the less that his usual habits are interfered with the better. The operation should be arranged for a time about corresponding with that of a meal in the ordinary course of affairs, so that the stomach will be reasonably empty. An aperient should be given 36 hours before the operation time. The old practice of giving an enema an hour or two before operation is to be discouraged. The less the patient is interfered with shortly before the anæsthetic is given the better. If he is nervous or a poor sleeper a bromide draught should be given last thing on the night preceding the operation. Bromidia is a useful preparation for this purpose. During the 24 hours before operation the patient should be encouraged to drink water or some mildly alkaline mineral water between meals. Vichy water can be freely and comfortably taken by most people who consume three pints with benefit in the 24 hours. During the same period barley-sugar should be sucked often in order to supply the desirable amount of extra glucose. Meals should be of the kind to which he is accustomed, but the proportion of carbohydrate constituents—bread, sweets, and fruit—should be increased at the expense of the protein (meat) factors. One feature in the preliminary preparation deserves more attention than it usually receives. This is the search for and removal of any form of local sepsis. Thus the mouth should be carefully cleansed after every meal, the teeth and gums examined and dealt with by a dentist if necessary. The nose and antra should be inspected and should receive any treatment found needful. The septic patient is likely to suffer from after-sickness. Besides treating the local sources of infection the practitioner will improve his patient's prospects of a comfortable recovery after anæsthesia if he supplies some general treatment too. Dr. Nixon Groves, who has given much attention to this subject, uses the hypodermic injections of isotonic iron and strychnine (Fraisse) consisting of: cacodylate of iron, 0·01 g.; glycerophosphate of soda, 0·1 g.; cacodylate of strychnine, 0·005 g. He also has seen much benefit from the preparation of aluminium hydroxide known as alocol. When an operation is not one of urgency a week or two spent beforehand in eliminating all chance of sepsis and in perfecting the blood-state of the patient is time well spent in a way that will repay both patient and practitioner after operation.

If the operation is planned for the morning, about 9 o'clock, the patient is allowed a cup of tea as late as 7 o'clock if he is awake and desires it. At 8 he has a hypodermic injection of atropine gr. $\frac{1}{100}$. Whether this is combined with morphine gr. $\frac{1}{6}$, with omnopon gr. $\frac{1}{3}$, or with scopolamine gr. $\frac{1}{100}$ must depend on the circumstances of the individual case and no routine law can be followed. In the case of nervous women it is a good thing to add the scopolamine. Patients who are likely to require large amounts of anæsthetic should have omnopon or both this and scopolamine in addition to the atropine. As regards morphia it is wise not to give it before operation unless the patient knows from experience that it suits him. Some instances of sickness after operation are undoubtedly due to morphia. Atropine, on the other hand, may be used as a routine, and is an important element in diminishing sickness after ether. The use of this drug and the abandonment of closed apparatus during long operations have greatly reduced sickness after ether administration. Another valuable measure from this point of view is to ensure mouth-breathing throughout the anæsthesia. Patients who breathe through the nose under the anæsthetic, and particularly those with partially obstructed nasal air-ways who yet strive throughout to breathe through the nose, are much more liable to sickness after than those in whom the mouth is kept adequately open throughout anæsthesia. These patients, with deficient nasal air-passages and high narrow pharyngeal vaults, are in any case the most likely to suffer from protracted taste or nausea after ether.

As regards the choice of anæsthetic one is sometimes helped by a previous history to avoid the drug which has made the particular patient sick on a previous occasion. Generally speaking, when nitrous oxide and oxygen alone are sufficient for the surgical procedure they are by far the most likely to give freedom from after-sickness. They provide, of course, no such immunity when ether or C.E. mixture have to be added in the course of operation. Short operations under ethyl chloride are rarely followed by sickness or nausea of any length of time, though they often are by headache. So far as the anæsthetist's part is concerned in preventing sickness by his actions during anæsthesia the golden rules are: (1) maintain free mouth-breathing; (2) avoid cyanosis; (3) prevent swallowing of mucus or blood in operations where this enters the mouth; (4) keep the amount of anæsthetic given within the lowest limit compatible with perfect anæsthesia; (5) do not let the patient regain consciousness before he is back in bed, and see that he is moved gently. When in bed, if the operation permits,

the patient should lie partly on his right side with the head on one pillow till consciousness has fully returned. After this the Fowler position can often be adopted with advantage.

Treatment after Anæsthesia.

This consists firstly in maintaining a quiet and darkened room. The patient lies with a towel moistened with eau de cologne or with vinegar laid over his face. Before consciousness has returned a rectal injection is given of half a pint of water containing 1 dr. of potassium bromide and ½ oz. of glucose, with 20 gr. of aspirin. By this means the drowsy period is prolonged, during which the elimination of the anæsthetic is completed and the likelihood of sickness is diminished. During the next 12 hours fresh fruit juice is the most suitable sustenance. Sucking pieces of fresh pine-apple relieves thirst, combats any unpleasant taste in the mouth, and supplies glucose. It is also for many people the most welcome and least nauseating form of nourishment during the early hours of recovery. Failing this, portions of orange may be sucked. If after consciousness has returned there is definite retching or vomiting a glass of water containing 1 dr. each of sodium bicarbonate and sal volatile is to be drunk outright. This must be repeated if necessary. In addition to this after abdominal operations, if there is distension as well as nausea, hypodermic injections of pituitrin in boiled water may be employed. An alternative measure which some have found successful is repeated administration of small doses of calomel. The practice of refusing absolutely to allow anything to be put into the stomach during the first 24 hours after anæsthesia does not meet with success enough to justify the extraordinary discomfort it inflicts on the patient. In some cases sickness is brought to an end by permitting some solid food in the form of cheese-biscuits or the like. In others there is presumably a nervous element in the causation, and the application of a mustard-leaf to the epigastrium is often successful, and so is placing the patient prone on his belly. If after 24 hours vomiting still goes on the stomach should be washed out with weak solution of bicarbonate of soda, and for 12 hours nothing should be given by the mouth, the patient subsisting on glucose and saline per rectum. It must be mentioned that crème de menthe has at times been found most successful in putting an end to post-anæsthetic nausea, and that a like success is often claimed for frequent small doses of iced champagne.

J. BLOMFIELD, M.D. Camb.,
Senior Anæsthetist and Lecturer on Anæsthesia, St. George's Hospital.

Previous articles in this series are:—

I. Medical Treatment of Gall-Bladder Disease, by Sir Humphry Rolleston. II. Early Pulmonary Tuberculosis in the Young Adult, by Dr. Claude Lillingston. III. Neuralgias of the Head and Neck, by Dr. Wilfred Harris. IV. Whooping-Cough, by Dr. T. Izod Bennett. V. Scabies and Pediculosis, by Dr. H. W. Barber. VI. Abdominal Injuries, by Prof. Charles A. Morton. VII. Aural Discharge in Children, by Mr. Harold Barwell. VIII. Vaginal Discharge, by Mr. A. W. Bourne. IX. Minor Injuries to the Eye, by Sir J. H. Parsons. X. Epilepsy, by Dr. Gordon Holmes. XI. Inguinal Hernia in Childhood, by Mr. C. W. G. Bryan. XII. Oblique Inguinal Hernia in Adults, by Prof. A. W. Sheen. XIII. Eclampsia, by Dr. Gibbon FitzGibbon. XIV. Club-foot in the Newly-born, by Sir Robert Jones. XV. Intestinal Worms, by Dr. R. Hutchison. XVI. Primary or Spasmodic Dysmenorrhœa, by Dr. G. Blacker. XVII. Measles, by Dr. Foord Caiger. XVIII. and XIX. Heart Failure, Preventive Treatment, Therapeutics, by Dr. J. Parkinson. XX. Gonococcal Epididymitis and its Bearing on Sterility, by Mr. Kenneth M. Walker. XXI. Ante-partum Hæmorrhage, by Dr. T. Watts Eden. XXII. Ringworm, by Dr. A. Whitfield. XXIII. Cystitis, by Mr. J. B. Macalpine. XXIV. Hæmorrhoids, by Mr. R. M. Rowe. XXV. Puerperal Sepsis, by Lady Barrett. XXVI. Cyclic Vomiting, by Dr. G. F. Still. XXVII. Asthma, by Dr. E. P. Poulton. XXVIII. Traumatic Rupture of the Urethra, by Mr. G. Grey Turner. XXIX. Habitual Constipation, by Dr. Arthur F. Hurst. XXX. Hypertrophied Prostate, by Prof. Charles A. Pannett. XXXI. Infantile Eczema, by Dr. H. MacCormac. XXXII. Exophthalmic Goitre and Other Forms of Hyperthyroidism, by Prof. G. R. Murray. XXXIII. Syphilis in the Woman of Child-Bearing Age, by Dr. Margaret Rorke.

Special Articles.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

Women's Medical Education: New Madras School.

THE new Lady Willingdon Medical School for Women, Madras, was recently opened by H.E. Lady Willingdon. The new school will have its permanent habitation in the Victory Buildings on the Marina, but the opening ceremony was performed at the Victoria Buildings, Egmore, where work will be carried on until the buildings on the Marina are ready.

Lady Willingdon was received by Surgeon-General T. H. Symons and the Hon. the Rajah of Panagal, Chief Minister, who stated that the existence of a central institution for medical training of women had been long overdue in the province. The missionaries had recently brought into existence a Medical School for Women at Vellore, but the necessity for a central Government institution continued; financial considerations had hitherto hindered the Government from bringing it into existence. The school was now to stand by the side of the Queen Mary's College and the Madras Women's Training School, associated with first-class women's and children's hospitals; before long it was sure to be raised to the status of a college.

The pupils of the institution were presented to Lady Willingdon by Dr. Mary O'Brien Beadon, superintendent of the school. Lady Willingdon then declared the new building open.

Famine Code Revision.

Some months ago a committee was appointed by the Madras Government, in accordance with a resolution of the Legislative Council, for the revision of the provisions of the Madras Famine Code, 1914. The Government have now issued orders on the Committee's report and the following points are of medical interest:—

1. The Government have accepted the Committee's recommendation that the minimum age-limit of working children be raised from 10 to 12 years, and that the grain allowance for this class be 60 tolas (1 tola = 180 gr. troy).

2. The Committee recommended a reclassification of non-working children in the light of modern physiology. Formerly there were only four classes: (*a*) in arms, (*b*) under 7 but not in arms, (*c*) under 10 but over 7, (*d*) between 10 and 14. The new classification of children recommended to and accepted by the Government, with scales of grain allowances in tolas, is as follows: (*a*) up to 1 year, 15; (*b*) over 1 year, under 5 years, 20; (*c*) between 5 and 8, 30; (*d*) between 8 and 12, 35; (*e*) between 12 and 14, 45.

3. As regards the scale of wages and allowances to adult workers the Government, after careful consideration, concluded that a general revision of the scale is not called for.

4. The Committee's recommendations relating to the treatment of pregnant women, which were supported by medical opinion and were accepted, were, briefly, that rest is essential both before and after confinement—one month before delivery, and six weeks or such longer period as the medical officer may consider necessary after delivery; and that these women should receive during these periods of rest the full wages of workers, not merely the allowance of dependents, and that the allowance of R.1 for medical comforts should be increased to Rs.2 in view of the rise in prices.

The Government have in other respects accepted a large number of the Committee's recommendations. The revision has considerably improved the Madras Famine Code.

Ankylostomiasis Campaign in Madras, 1922.

The Madras Government have recently issued the report of Dr. W. H. Kenrick, director of the ankylostomiasis campaign for the year 1922. The campaign in Madras was initiated in the early part of 1920, when, upon invitation, the International Health Board lent the services of one of their officers. Dr. Kenrick had recommended during 1921 an extension of the work in several directions, including wider publicity,

control measures in tea and coffee estates for a prolonged period, practical demonstrations and control measures in schools, and field studies of the stool habits of the people with the object of devising acceptable measures to stop soil pollution. This plan of work was sanctioned early in 1922, and before the end of the year the field staff had been increased to four sub-assistant-surgeons. The intensive work begun in North Arcot district was continued throughout the year, and in addition gratifying results were obtained on several tea estates in the Anaimalai Hills. A laboratory was opened in the General Hospital, Madras, where all persons admitted were examined, and the sub-assistant-surgeon in charge was also ordered to treat and instruct as many as possible of the inhabitants of the city. One interesting piece of work was done in the Medical College, Madras, where specimens were collected from 798 students and examined for hookworm. Over 80 per cent. of the students were found infected. A campaign was also conducted in a number of schools and factories with excellent results, while an infection survey commenced in Kistna district early in November was completed in December. No definite opposition to the work was experienced, but it was often very difficult to get specimens collected, except in schools and hospitals or where large numbers of labourers are employed. The attitude of employers of estate labour was not encouraging. Attempts to secure latrine construction in villages have so far proved futile. In June, Government issued an order requesting presidents of district boards of those districts having a district health officer to report through the Director of Public Health the steps they proposed to take for the control of hookworm infection, and similar reports were requested from the presidents of other district boards and chairmen of municipal councils in September, 1922. Summaries of the replies of 17 district boards and 59 municipalities have been prepared; 15 chairmen of municipal councils reported that hookworm did not exist in their municipalities or that hookworm was not prevalent and that it was not proposed to take any steps. In reply to this, surveys were undertaken in a number of places, and at Bezwada, for example, 1239 persons were examined and 1049, or 84·6 per cent., were found infected; in Masulipatam 90·6 per cent. of those examined were found infected. It has not been possible, of course, to conduct surveys in all towns and districts where local authorities denied the existence of hookworm, but these instances prove the necessity for an educative campaign. This mistaken idea is shared by people all over the province, and it is very important that microscopic examinations and worm counts be made early in as many districts as possible, so that specific knowledge of the incidence and severity of the infection may be at hand when it becomes possible to devise means for its control.

The total number of treatments given during the year was 49,916; of these 30,672 were first, 18,781 second, and 463 third or subsequent treatments. The drugs used were thymol, beta naphthol, oil of chenopodium, and carbon tetrachloride. Only a small quantity of the latter drug was obtainable and about 1000 doses were administered. The results obtained with carbon tetrachloride were most satisfactory. A few complaints of giddiness, headache, and slight burning in the stomach were received, but beyond these no objective or subjective symptoms arose. Oil of chenopodium found most favour with the masses. One fatality occurred which was probably a result of poisoning with oil of chenopodium: A very severely infected child of 6 years of age was treated with chenopodium and in the afternoon became sleepy and listless; during the night it fell into a state of coma and died early the following day. Three patients treated with an undivided 40–50 gr. dose of thymol completely collapsed, but all revived when given injections of strychnine, and were able to walk home within three hours. Dr. Kenrick considers that an undivided dose of 50 gr. of thymol, either with or without a purge, is not safe, and even a dose of 40 gr. may produce alarming symptoms in apparently strong healthy adults.

With regard to soil pollution the report contains some very pungent remarks. One public latrine for each 22,000 inhabitants in an area populated by 45 millions of peopleindicates conditions in the Presidency, and soil pollution occurs to as great an extent in municipalities as it does in rural areas. Dr. Kenrick considers, however, that soil pollution is not solely a result of an insufficiency of latrines, because in many places there are latrines which are never used. The people require to be taught that such things exist and what purpose they serve. A scheme is now being devised in Madras for the extensive treatment of persons harbouring hookworms. Estimates are being prepared of the cost involved in equipping all Government and local fund hospitals and dispensaries with the necessary materials, and by the middle of this year it was hoped that free treatment for hookworm infection would be obtainable at any hospital or dispensary in the Presidency. The infection surveys previously mentioned are conducted in coöperation with local health officers and with medical officers in charge of hospitals, and during their progress every effort is made to start local campaigns of examination and treatment which will be continued by the local medical officers in charge. In connexion with the educational part of the campaign, 124 lectures were delivered to audiences aggregating 25,874. A cinema film "Unhooking the Hookworm" has also been exhibited in a number of places. About 100,000 pamphlets and circulars were distributed, largely in schools, during the year.

New College and Hospital at Vizagapatam.

The Rajah of Panagal, Chief Minister, Government of Madras, recently opened the new Medical College and King George's Hospital, Vizagapatam. In his address the Chief Minister congratulated the staff on the good fortune of securing the services of Mr. Henderson as principal of the medical college. The idea of establishing a separate headquarters and Government Hospital was that of Sir Alexander Cardew. The Chief Minister, after tracing the history of the College, said that the Andhra community need not be anxious about the inauguration of an Andhra University, now that the Medical College had come into existence, the latter being the chief and the most costly item in the starting of any university. The Andhra University would, therefore, soon be an accomplished fact. He then declared the Medical College open. The Medical School will remain in its present location for two years, by which time a pukka building will be constructed. During the opening of the King George's Hospital the Chief Minister pointed out that there were only 20,000 medical practitioners in the Madras Presidency, while there were not less than 40,000 practitioners in England and Wales. That was the justification for embarking on an expensive venture in days when retrenchment was the cry everywhere. One of the criticisms levelled against the proposal was that Ayurveda should be encouraged, but the establishment of the new hospital would in no way obstruct or hinder the progress of indigenous medicine.

Madras, August 1st.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Prophylaxis of Measles.

Dr. Degkwitz, of Munich, recently reported that in 175 cases of children undoubtedly infected with measles he has been able to prevent the disease from developing by giving injections of serum taken from convalescents. The efficiency of the method was proved in hospitals, creches, and orphan asylums, and also in private practice, by the fact that children living under the same conditions, in whom no injection was made, caught the disease. Of the cases receiving serum

some were injected from the second to the third day of incubation, some on the fifth and sixth day, and the remainder still later. In the first series of cases a dose of 20 c.cm. was injected, but later it was stated that 3 c.cm. were just as efficacious. A smaller dose than 3 c.cm. did not prevent infection, but greatly weakened the virulence of the disease; prodromes and complications were absent, the exanthem was rather pale, and the fever was of short duration. Injections after the seventh day of incubation had no effect on the development or severity of the disease. The lasting efficacy of the serum was shown by the fact that injection of serum of adults who had had measles when young distinctly reduced the severity of the disease. The serum must be taken from the convalescent on the seventh day after the cessation of fever, when the blood contains the greatest quantity of antibodies; 40 c.cm. are taken from a vein of the arm, giving about 17 c.cm. of serum, to which are added a few drops of a 5 per cent. solution of carbolic acid. The serum is then preserved in ampoules. Degkwitz insists on the importance of preventing young and weak children from catching the disease, and states that the latter is not so harmless as it is believed to be by the well-to-do classes, in the Children's Hospital at Munich the general mortality from measles being 15·1 per cent., rising to 28·8 per cent. in children under 2½ years of age. The Government Medical Department has already taken steps to procure the serum for professional use; it will be prepared in children's hospitals and stocked in municipal health offices, and will be issued to medical officers of orphanages, creches, and similar institutions, and also to general practitioners. The department invites the profession to assist the work by notifying cases of convalescent children in order that the serum may be taken from them, provided the parents do not object.

Medical Men and the Profiteering Act.

The Act dealing with profiteering threatens with heavy penalties and imprisonment every person who charges for necessities a price out of proportion to the cost plus a reasonable profit. This law, which hitherto applied only to the sale of foodstuffs, clothing, &c., will now be extended to the charges of medical men among others. The new provision has created great indignation among members of the medical profession. The Act has already passed its first reading; the Leipziger-Verband has asked the Government to proceed no further with it, pointing out that patients are unable to estimate a doctor's difficulty and expense connected with any given case, and will, no doubt, be very ready to inform the public prosecutor if a fee seems to be too high. The Leipziger-Verband claims that the medical profession has always shown great unselfishness in its dealings with pauper patients, and that the Workmen's Insurance Act, under which they receive inadequate pay, would not work without their assistance. They consider it degrading to be threatened with fines for misdemeanours to be classed with those of grocers, tailors, and store-keepers who have charged too much for their goods. If the new clause is not withdrawn, they demand a provision to the effect that the public prosecutor may not take action against a medical man without having previously asked the opinion of the local Medical Chamber concerning the adequacy of a doctor's fee. It is, of course, feared that without some such provision a wanton or spiteful accusation from some disappointed patient may ruin the reputation of a medical man. The Minister of Justice has replied to the effect that, as the Act has already passed its first reading, it is too late to alter its provisions, but that he will instruct the responsible officials to prosecute only in cases of unquestionable overcharging, and that in doubtful cases the opinion of a Medical Chamber will be sought.

Threatened Strike of Club Doctors.

Medical men engaged in club practice have complained that their club fees, already very small, are paid so late that they lose a great deal of their value by the progressing depreciation of the currency. Negotiations with the club boards having led to no result, the Association of Club Doctors decided to strike; August 1st was fixed as the date of commencement of the strike, and arrangements were made so that from that date no difference of fee between private and club patients would be allowed—that is to say, that payment from club members would be required at once and on the same scale as from private patients, and that certificates for sick pay would only be issued by the medical men after payment (according to the existing agreement the latter payment is included in the consultation fee). In order to help the club doctors the medical faculty gave orders that during a strike no patient belonging to a club should be attended at a university clinic, and the same regulation held in out-patient departments of the Berlin hospitals. The Government Medical Department, anxious to avoid the great harm to public health which would have resulted from the strike, offered to arbitrate; the offer was accepted by both parties to the dispute, and negotiations followed under the chairmanship of a member of the department. Finally, on July 30th, an agreement was made according to which the remuneration of medical men was to be paid weekly instead of monthly or even quarterly. The pre-war sum of 5 marks for every member of the club is to be multiplied at the time of payment by the index figure representing the increase of the cost of living. The demand that the clubs should pay additional fees for the use of instruments, electric light, &c., was not conceded, being postponed for further consideration. The strike was thus avoided at the last moment. It may be remarked that pharmacists are also preparing to strike on account of late and irregular payments by the clubs; they announce that failing more rapid payments they will henceforth require cash from club members before medicine is delivered.

Combating the Red Ant.

The biochemical section of the German Institution for Agriculture has drawn attention to the fact that large colonies of the red house-ant, *Monomorium pharaonis*, have in recent years settled in Germany. The insects not only invade pantries and provision rooms, but have also a predilection for sputum, pus, and blood, and are therefore frequently seen in hospitals. They creep into the mouth, nose, and ears of children, and in one case were even seen invading plate-cultures and cadavers in dissection rooms. Their destruction, though difficult, since they nest beneath flooring, is very important, owing to the possibility of their spreading contagious diseases. The Institution invites hospitals to notify them when the insect is observed, and will then advise as to means of destruction.

Insurance against Hospital Expenses.

The expenses for a stay in hospital have become so high for patients not belonging to a sick-club, that a disease requiring hospital treatment may sometimes entail the ruin of a household. The head of the Government Medical Department, Prof. Gottstein, has therefore suggested that for the middle classes private insurance against hospital expenses should be instituted. This has lately been done, a company called "Salus" having been established for the purpose. The insured have to pay a premium of 5 gold marks a year, for which sum the company covers the insured person to the extent of one gold mark a day, the expenses of the period in hospital not exceeding 13 weeks. The profits of the company are limited to interest at 6 per cent., and any profit in excess of this figure must be spent for purposes of public welfare.

Quality of the Milk in Berlin.

Dr. Bing has recently examined 100 specimens of milk supplied in Berlin, purchased from different shops, and has come to the conclusion that the liquid supplied was sometimes more like an emulsion of bacteria than a potable milk. The bacteria

referred to were of pathogenic species; in two of ten specimens pus was present, the milk obviously coming from animals suffering from diseases of the udder. The interior of vessels serving for the transport of the milk sometimes showed a stratum of milk, casein, and fatty substances, forming an ideal nutrient medium for bacteria.

The Supply of Medical Books.

The decision of leading publishers to suspend the issue of scientific works has been expected for some time. These books have become a drug on the market, as the reading public for this kind of book no longer has any money to purchase them. Even the public and university libraries can no longer afford to do so. The Rockefeller Institution, which on former occasions had greatly supported German medical work by procuring foreign books and journals for German medical men, has made a further gift of a new series of six copies each of 400 British and American medical journals. According to a system planned by the "Notgemeinschaft" (THE LANCET, 1922, ii., 1245) two of the copies will be kept in the State libraries of Berlin and Munich, whilst the others will circulate among the libraries of German universities, at each of which they will remain for a maximum period of two months. To facilitate the circulation the universities are divided into four groups of five to six universities each, so that every university library has the respective journal at its disposition within one year of publication. The southern group of universities consists of Freiburg, Tübingen, Heidelberg, Würzburg, and Munich; the northern group includes Hamburg, Kiel, Rostock, Greifswald, and Königsberg; the eastern group Berlin, Halle, Leipzig, Jena, and Breslau; and the western group Frankfort, Giessen, Marburg, Göttingen, Münster, Cologne, and Bonn.

A Model Rontgen Institute.

Messrs. Siemens and Halske, the well-known electrical engineers, have presented to the city of Berlin a full equipment of a modern radiographical institute with all the modern apparatus, with an undertaking to replace any apparatus as soon as a new invention has made it obsolete. The medical department of the city, in accepting the generous offer, proposed the appointment of a leading radiologist, and asked the municipal council to bear the cost of installation in the Moabit Hospital, where the institute is to be established.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

The Elections.

ALTHOUGH the poll was taken on Monday the results of many contests are not yet available, as proportional representation requires time to work out. For the National University Mr. Michael Hayes, Prof. John MacNeill, and Prof. William Magennis have been returned. None is a member of the medical profession, but all took a keen interest in medical matters in the last Dail, and their return will facilitate the proposed scheme of medical legislation in the Free State.

Food Prices in Dublin.

Last November a commission was appointed by the Government to inquire into the high prices of foods which still rule in the Free State. It has now reported its inability to arrive at any practical conclusions. Not being possessed of statutory powers to compel evidence the commission found itself met by a unanimous refusal on the part of traders to give any assistance. Brewers, bakers, millers, grocers, spirit grocers, all refused to reply to questionnaires issued by the commission. On the other hand, the commission finds fault with the purchasing public in that more voluntary evidence was not brought forward. No reason is given, however, for the failure of the commission to employ investigators on its own behalf, and one cannot but think that a little more zeal on the part of the commission might have produced more tangible results. Enough evidence was obtained nevertheless to show that prices of some commodities in Dublin are inexplicable on any economic basis. Guinness's porter, produced in Dublin, costs more in Dublin than in London, Leeds, or Cork, or apparently than anywhere in the British Isles. The price of milk in Dublin, for example, is without precedent. On this point the commission makes its only definite proposal. They recommend that a commission with statutory powers of obtaining evidence should be appointed to inquire into the price of milk in Dublin and the possibility of establishing some more economic system of producing and distributing milk than at present.

Increase of Admissions at a Mental Hospital.

At the last meeting of the committee of the Grangegorman Mental Hospital it was reported that there had been an increase of 91 patients since last year. A letter was read from the Secretary of the Local Government Department suggesting that the committee should consider whether separate provision for chronic and harmless cases should not be made, and advocating the conversion of an existing building in the district as an auxiliary mental hospital.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt F. J. A. Dalton, C.M.G., to R.N. Hospl., Haslar, temp.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Comdr. W. B. Betenson to be Surg. Capt.
Surg. Lt.-Comdr. F. J. S. Heaney to be Surg. Comdr.
Surg. Lt.-Comdr. J. B. Ronaldson to *Vivid*, addl., for R.N. Hospl., Plymouth, addl., for 14 days' training.

ROYAL ARMY MEDICAL CORPS.

Capts. to be Majs.: B. H. H. Spence (to remain secd.), W. B. Laird, R. Davidson, H. S. Blackmore, J. M. Elliott, F. R. B. Shrimshire, D. W. Bruce, W. L. Webster (Bt. Maj.), E. B. Allnutt, S. P. Sykes, H. C. Todd (Bt. Maj.), H. J. G. Wells, F. S. Tamplin, W. Stewart, and A. S. Heale.
Capt. T. P. Buist is restd. to the estabt.
The undermentioned to be Lt. (on prob.): F. J. O'Meara, W. B. F. Orr, and T. W. Davidson.
Temp. Capt. R. R. Law relinquishes his commn. and retains the rank of Capt.

ARMY RESERV E OF OFFICERS.

Maj.-Gen. O. R. A. Julian, late R.A.M.C., having attained the age limit of liability to recall, ceases to belong to the Res. of Off.
Maj. and Bt. Lt.-Col. A. J. Chambers, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

ARMY DENTAL CORPS.

Lt. (temp. Capt.) G. W. Allen to be Capt.

ROYAL AIR FORCE.

Flight Lt. W. G. L. Wambeek is granted a permanent commission, J. J. Walsh is granted a short service commission as a Flight Lt., G. M. Mellor is granted a temporary commission as a Flight Lt., and F. K. Wilson is granted a short service commission as a Flying Officer and is seconded for duty at the Bristol Royal Infirmary.

INDIAN MEDICAL SERVICE.

Col. to be Maj.-Gen.: W. H. Ogilvie.
The King has approved the retirement of the following officers: Lt.-Col. C. E. Williams, Maj. H. S. Hutchison, Maj.-Gen. Sir C. C. Manifold and Maj. N. H. Hume, and of the resignation of Capt. O. Wilson.

REGISTRATION OF HEALTH VISITORS IN SCOTLAND.—The Scottish Board of Health announce the opening of a register of health visitors. Persons discharging on behalf of a local authority all or any of the duties of a health visitor under a scheme of maternity service and child welfare or of tuberculosis or otherwise, and also persons discharging all or any of the duties of a school nurse under a scheme of school health administration, may apply for certification and registration. Forms of application will be supplied by the Board, 121a, Princes-street, Edinburgh.

CANCER:

MEMORANDUM OF DEPARTMENTAL COMMITTEE OF MINISTRY OF HEALTH.

A REPRESENTATIVE committee was recently appointed by the Ministry of Health to draw up a memorandum on cancer for the guidance of local authorities. The constituent members were: Sir George Newman (chairman), Dr. C. J. Bond, Sir George Buchanan, Dr. S. Monckton Copeman, F.R.S., Dr. Major Greenwood, Prof. F. Gowland Hopkins, F.R.S., Prof. W. S. Lazarus-Barlow, M.D., Dr. J. A. Murray, Dr. T. H. C. Stevenson, Dr. S. Wyard, Lieut.-Colonel A. B. Smallman, M.D. (secretary).

The terms of the memorandum are as follows:—

Characteristic Features and Natural Course of Cancer.

In this memorandum the term "cancer" is applied to a group of morbid conditions known to affect man and lower animals in all parts of the civilised world. The members of this group differ widely in naked eye and microscopical appearances. They also differ in the age of the individuals affected, in the rapidity with which they run their course, and in their liability to become generalised throughout the body. But they all agree in that (i) they are manifestations of disordered overgrowth of some tissue of the body, (ii) they are at first local, (iii) they are not encapsuled, (iv) they progressively invade the deeper parts, (v) they readily undergo degenerative changes, (vi) they tend to become disseminated to distant parts of the body, (vii) they lead sooner or later to the death of the individual in the vast majority of cases.

From the standpoint of preventive medicine and public health administration, there is a conspicuous contrast between cancer and groups of other morbid conditions, such as the acute infectious diseases or tuberculosis, for which the fundamental principles of prevention are well established. From the mass of medical experience and literature on cancer, old and new, we have an extensive knowledge of its natural course and pathological anatomy; from mortality and other records we know much about its occurrence and geographical distribution. But knowledge useful for its prevention is still far from complete. The root cause or causes on which the occurrence of cancer depends remain obscure. We do not possess any specific means of producing immunity against cancer, as we have against small-pox, nor have we any specific means of curing the disease analogous to quinine for malaria or arsenobenzol compounds for syphilis. In all these directions much valuable research work has been undertaken, both within laboratories and outside them, and such research is being further pursued. Study with this object ought to receive every possible support from central and local health authorities, from those responsible for hospitals and other institutions, from voluntary agencies, and from the general public.

Extent of Cancer Mortality and its Increase.

In a population of 37,885,242 persons in England and Wales in 1921, a total of 46,022 deaths were attributed to cancer. These figures imply that out of each average million persons 1215, and out of each thousand 1·21, died of cancer. The death-rate per 1000 of the population attributed to cancer in England and Wales has gradually increased from 0·32 in 1851–60 to 1·12 in 1911–20, and 1·21 in 1921. To some extent this fourfold increase is due to the fact that a larger proportion of the population than formerly is now of those ages at which deaths from cancer commonly occur; but when full allowance has been made for this ageing of the population, the increase is from 0·33 in 1851–60[1] to 0·97 per 1000 in 1911–20, and 1·01 in 1921, so that in the space of two generations the recorded mortality has trebled.

It has long been matter for discussion to what extent this increase has been due to improved diagnosis and more accurate certification of cause of death. There can be little doubt that these factors have been contributory, but unfortunately it has now to be recognised that they will not account for the whole of the recorded increase. Superficial cancers, such as those of the tongue or the female breast, were readily recognisable as such even 60 years ago, by the time death occurred. Yet in the 20 years' period 1901–21 (after making allowance for the ageing of the population) the mortality of males ascribed to cancer of the tongue has increased from 38 per million living in 1901 to 53 in 1921, and that of females from cancer of the breast from 148 in 1901 to 190 in 1921, increases of 39 and 28 per cent., respectively, in 20 years. During the same period the mortality, similarly stated, of the total population from all forms of cancer increased from 841 per million in 1901 to 1007 in 1921, or by 20 per cent. There is only one part of the body frequently attacked by cancer, the womb, in respect of which significant increase in mortality is not recorded during these 20 years—a fact which may in some degree be attributed to the fall in the birth-rate.

During this period of 20 years, from 1901 to 1921, in which cancer increased by 20 per cent., the general death-rate fell by 32 per cent., that of infants by 45 per cent., and that from tuberculosis by 38 per cent., while substantial declines were recorded with respect to most other causes of mortality.

An increase of mortality attributed to cancer is the common experience of modern civilisation.

The frequency with which different parts of the body are attacked by fatal cancer differs greatly in different countries; it may differ over a period of years even in the same country; and changes are occurring not only in respect of the parts of the body attacked by cancer, but also in regard to the ages at which deaths occur. In this country the tendency is for deaths from cancer to occur later in life than formerly, and this change has been going on, at least amongst females, for many years. The latest available returns show that the death-rate from cancer is not increasing for males up to 45 years of age, and for females up to 60. The most rapid increase is occurring in extreme old age.

Great differences in regard to the parts of the body attacked by cancer also exist between the sexes. The excess of deaths of females (over males) from cancer is entirely due to malignant disease of the breast and generative organs; in most other parts of the body a considerable excess is recorded for males. There is a great difference between the relative frequencies of different forms of cancer amongst married and single women. Cancer of the womb is more fatal to married and widowed, and cancer of the breast and ovary to single women. In 1911–20, for every 100 deaths of single women from cancer of the breast, there were 392 deaths of married women, for every 100 deaths of single women from cancer of the ovary there were only 272 deaths of married women, but for every 100 deaths from cancer of the uterus in the single women there were as many as 1009 amongst the married women. During this period there were 463 deaths of married and widowed for every 100 deaths of single women, so the excess of deaths for the married is much larger than normal in the case of cancer of the womb, but smaller than normal in those of the breast and ovary. The death-rates for 1911–20 corrected for age distribution are not yet available, but for the years 1911–13 we have the following figures, which are death-rates per million women living corrected for age distribution:—Cancer of the womb: Unmarried women, 169; married and widowed, 293. Cancer of the breast: Unmarried women, 346; married and widowed, 238. Cancer of the ovary: Unmarried women, 60; married and widowed, 31.

[1] Another way of presenting the facts is this. In 1851–60 the mean population living in England and Wales is estimated to have been 18,996,916 of whom 60,196 (317 per million living per annum) were recorded as dying of cancer. In 1911–20 in an estimated mean population of 35,750,765 the number of deaths ascribed to cancer was 399,511 (1,117 per million living per annum).

Proclivity to Cancer.

The large majority of people go through life, even to old age, without suffering from cancer, but the geographical and social distribution of cancer mortality shows that the risk of being attacked by cancer is one which is widely disseminated. In a broad sense, liability to cancer is not an attribute of any particular social class, profession, or occupation. It is to be inferred, therefore, that the occurrence of cancer depends, to an important degree, on personal predisposing factors. For the purpose of this memorandum there would be no advantage in detailing or summarising studies or speculations on the nature of those factors, on the specific, general, or constitutional antecedents of cancer, or on the meaning of "proclivity" to cancer. Knowledge is not far enough advanced. It is right, however, to point out that *hereditary* predisposition to cancer has not at present been proved to be of any practical importance in man; that it cannot be asserted with scientific authority that the use of any particular article of food increases the liability to cancer, or prevents it from appearing; that no known drug or preparation will prevent its appearance or cure it when present; and that no danger of cancer has been proved to result from inhabiting houses or districts in which cancer happens to have been exceptionally common. There is no evidence to show that cancer is an infectious or contagious disease.

Chronic Irritation as a Determining Factor in the Appearance of Cancer.

One certain fact about cancer is that it frequently follows on chronic and prolonged irritation. Not all tissues, however, are equally liable in this respect. The palm of the hand, for example, in spite of its exposure to chronic irritation of all kinds, is probably never the seat of cancer. In the female breast cancer occurs far more commonly in the deeper parts of the gland than in the nipple, which is more exposed to injury. Some tissues show a special liability to develop cancer during chronic irritation, such as the skin of the face, the lips, insides of cheeks, tongue, lower part of bowel, neck of womb. Certain varieties of chronic irritation, too, are more liable to be followed by cancer than others. Thus, in the lip, long continued irritation by a clay pipe is particularly dangerous; in the tongue, irritation by a jagged tooth or badly fitting toothplate; in the womb, the chronic ulceration which may follow confinement. Again, syphilitic disease affecting the tongue or female external generative organs, or tuberculosis of skin (lupus) affecting the face, particularly if it has necessitated prolonged treatment, is liable to end in cancer. And lastly, workers in tar, such as briquette makers, workers with anilin or paraffin, chimney-sweeps, and mule-spinners are apt to suffer from cancer in special parts of the body as a consequence of repeated irritation by the particular agent concerned.

This liability of cancer to follow chronic irritation of so many different types is remarkable, and leads to the supposition that beneath them all there lies some common factor—as yet unrecognised—which is fundamental to the passage of a chronic inflammatory and non-cancerous condition into one that is definitely cancerous. In one variety of cancer (rodent ulcer) the distribution of the new growth is such that it suggests a close relationship with the nerve-supply of the affected part. How far this is true and how far modifications of the body itself as distinguished from the chronic irritant play a part in the ultimate production of the cancer it is impossible to say in our present state of knowledge.

Prophylaxis.

While considerations such as those in the section on Proclivity to Cancer show how far we are from being able to say how cancer is to be avoided, those under the heading of Chronic Irritation as a Determining Factor in the appearance of cancer indicate that there are at least some provocative causes of cancer which can be guarded against. Since cancer occurs more commonly in certain sites, it is prudent to notice and remove causes of chronic irritation in these sites. Apart altogether from cancer, people should attend to these conditions in the exercise of common care for their general health and fitness.

In this category, for example, and for reasons just given, come the removal of rough stumps of teeth or replacement of badly fitting dentures; a change of habit if pipe-smoking is found to produce soreness on the same spot of the lip or tongue; an alteration of clothing which causes irritation of particular regions of the body—for example, the breast; the avoidance of constipation and other like matters. On the same basis the possibility of establishing a chronic irritation in a region liable to cancer gives an additional reason for obtaining advice and treatment in disorders of the stomach, bowels, or womb. Finally, special precautions, the nature of which is well known to those concerned, must be adopted in certain occupations (tar, &c.) known to entail superadded and specialised risks of cancer.

Diagnosis of Cancer.

For reasons that are indicated in the next section (Treatment) early diagnosis is of the greatest importance. This means not only diagnosis of the actual existence of cancer, but, even more, diagnosis of the existence of abnormal conditions that are common precursors of cancer. Cancer itself in its early stages is almost invariably unaccompanied by pain, and is sometimes painless throughout. This painlessness of cancer in its early stages is one of its most insidious dangers, since it leads the patient to delay seeking medical advice. Were cancer as painful in its early stages as toothache, there would be far fewer of those pitiable cases in which the patient first seeks advice when the cancer has reached a stage beyond all but palliative treatment.

Early diagnosis obviously depends upon coöperation between the patient and the doctor. Medical advice should be sought at once, particularly if a tumour or lump is found in the breast, if an ulcerated condition exists on the tongue, lip or skin which does not heal in a few days, if there is persistent hoarseness, if a mole or wart shows a tendency to grow, if blood or mucus is passed with the stools, if there is bloody or offensive discharge at other than the normal monthly periods, especially at the change of life or after it has passed. Even with the greatest care and skill doubtful cases occur; but only after careful medical examination can it be decided whether such conditions are or are not indicative of cancer, and those who seek advice in these circumstances are taking a wise course quite apart from cancer possibilities. An abnormality is there, and whatever it is due to it should be treated and not nursed in secret.

Treatment.

If a person has not recognised that something is wrong—and such cases occur—nothing more can be said. But very many persons are aware that something is wrong, fear it may be cancer and put off consulting a doctor because they think that if cancer be diagnosed an operation will be necessary. Quite apart from the facts that anæsthetics and antiseptics have robbed operations of many of their terrors, and that many such cases would not be cancerous at all, the chances of a patient must be better the earlier he or she comes under treatment. Most medical authorities believe that in cancer early operation affords the best chance to the patient, although they would not feel justified in stating that all risk of recurrence is necessarily removed by operation, even if undertaken in an early stage of the disease. But there is indubitable evidence that removal by operation, though ultimately followed by recurrence, enables many people to live a natural life in comfort for considerable periods, while in advanced cases such removal may relieve or prevent prolonged suffering. There are many cases, moreover, in which cancerous growths have been removed once and for all, the patient has lived for years afterwards without recur-

rence, and has ultimately died from an entirely different cause.

And, lastly, evidence is accumulating that in some varieties of cancer, and in some situations, radium or X ray treatment, or diathermy, carried out by expert medical practitioners, offers at least as good a chance to the patient as surgery, without the attendant disadvantages, and in other cases it may be tried when surgery is out of the question. *The essential point is that the patient should not postpone or delay seeking competent medical advice, and, above all, should not waste time or money by trying quack remedies which at best are useless, and at worst aggravate the disease. In any condition in which cancer is suspected, immediate and decisive action is necessary.*

The actual prospect of length of life after measures for the removal of cancer have been taken is not a matter for dogmatising, but without question the earlier these measures are adopted the better.

Local Health Authorities and Cancer Questions.

Propaganda.—Many local authorities, on the advice of their medical officers of health, undertake invaluable "propaganda" in relation to certain diseases by means of public notices, advertisements, broadcast leaflets, lectures, cinemas and the like. The considerations set out above show how greatly cancer differs, in regard to the applicability of these methods, from a disease such as small-pox, for which there is a sure preventive to be proclaimed, from other diseases of the infectious class where individuals must be urged to take precautions for the safety of their fellows, or from diseases such as the venereal group for which special and gratuitous treatment is provided out of the public funds, and requires to be advertised. Much caution is obviously needed in announcements to the public on cancer in order to avoid overstatement, the making of promises which are not warranted by evidence, or the production of needless and mischievous apprehension of cancer. If all this is realised, knowledge of some of the main facts of cancer (negative as well as positive)—such as are indicated in this Circular—may usefully be spread through the ordinary agencies of public health departments, notably by instruction at welfare centres, by midwives and maternity nurses,[2] and by social welfare workers. It need hardly be added that it is important for the medical officer of health in advising on these matters to enlist the counsel and assistance of other medical men, whether specialists or general practitioners, in his area.

Facilities for Diagnosis and Treatment.—It is not contemplated or suggested that there should be established throughout the country a public cancer service, analogous to the services for tuberculosis or venereal diseases, or that for treating acute infectious diseases. Even if such a service were considered desirable, it would be out of the question until other matters, such as the improvement of undergraduate and post-graduate medical education in cancer diagnosis and treatment, have been further developed. But public health authorities, insurance committees, boards of guardians, or other public bodies concerned should not feel discouraged from individual action within the competence of these bodies from assisting in securing better facilities for diagnosis or more effective treatment of cancer in the areas or institutions under their jurisdiction. It has, for example, been suggested that local authorities, in conjunction with the local representative bodies of the medical profession in suitable areas (acting through a special cancer committee or otherwise) might periodically undertake a review of such questions as the following, considering in each instance whether steps could and should be taken to meet the requirements of the area and the medical profession within it, and enlisting the help of all who are likely to be of assistance:—

(1) Improving the local facilities for clinical consultations and for pathological examinations;

(2) Improving the local facilities for cancer treatment (operative, or provision of X ray and radium apparatus), and considering the adequacy of arrangements for this purpose at hospitals, local institutions, &c., which serve the area;

(3) Improving the facilities for transport of patients;

(4) Arranging locally for post-graduate demonstrations, lectures, or courses on cancer for medical men practising in the area;

(5) Arranging locally for the education of the public as indicated in the paragraph on propaganda.

Should such local medical consideration of cancer problems lead to applications for the assistance or coöperation of public health authorities as well as of voluntary agencies and individuals, the Minister is confident that these applications will be considered practically and sympathetically by those to whom they are addressed. The Department will be glad at any time to receive communications on the matters above outlined in cases in which it would appear that its action would be helpful or its knowledge of local progress in dealing with cancer questions might be increased.

[2] The Central Midwives Board issues an instructional note on cancer to all midwives on registration, and includes questions on cancer in women in their examination for certificates.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some of the principal health statistics of 11 London boroughs taken from reports for the year 1922:—

Name of borough.	Estimated (R.-G.) mid-year population.	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory with influenza.	Infant mortality		Maternal mort. in childbirth.
							Legit.	Illegit.	
Chelsea	63,920	16·1	13·3	0·9	1·6	—	—	—	11·6
Deptford	114,100	23·1	13·8	1·4	1·3	3·4	—	—	3·0
Fulham	159,500	20·3	12·1	1·2	1·3	2·8	67	103	3·7
Hampstead ..	86,920	14·8	11·1	0·8	1·6	2·1	49	162	4·7
Kensington ..	179,100	17·6	13·6	0·9	1·5	3·5	78	135	5·0
Paddington ..	145,300	18·8	13·0	1·0	1·3	3·0	62	145	2·9
Poplar	165,700	26·6	14·3	1·3	1·1	4·2	78	115	2·7
St. Marylebone	105,200	16·0	13·8	1·2	1·6	3·5	57	170	0·6
St. Pancras ..	212,500	21·5	14·6	1·5	1·4	3·5	69	150	2·8
Southwark ..	187,220	24·4	15·5	1·6	1·0	4·4	78	121	2·8
Westminster ..	141,800	13·4	12·9	1·2	1·6	3·2	49	100	3·7

The lines indicate that the report did not give the information.

Chelsea.

Dr. Louis C. Parkes, whose impending resignation is announced, mentions in his report for 1922 that the borough council spent £965 in subsidies to the Chelsea Health Society, the Red Cross Babies' Nursing Home, the Chelsea Day Nursery, the Chelsea Branch of the Invalid Children's Aid Association, the Chelsea District Nursing Association, and to convalescent homes for nursing mothers, and his report shows the benefits accruing. Half of the amount of the subsidies is recovered as a Ministry grant. Unfortunately, the Babies' Nursing Home had to be closed in July on account of complaints of the noise of crying infants and it has not been possible to acquire other premises as yet. There were 40 deaths from influenza and 53 notifications of acute primary pneumonia during the first quarter. Sixty per cent. of the deaths from pulmonary tuberculosis occurred in institutions. There were two deaths from puerperal fever and ten from other diseases, &c., of pregnancy. Of the latter,

four resulted from miscarriage, one illegally procured, three were due to eclampsia, and one each to rupture of the uterus, contracted pelvis, and nephritis. None of these cases had attended the ante-natal clinic of the Chelsea Health Society. The borough council have purchased a site of 60,000 square feet on the east side of Hortensia-road on which to build three- and four-roomed flats. The Ministry have required that the frontage of the site on Fulham-road be offered for sale and not included in the housing scheme.

Deptford.

In view of the decision of his council to give the annual health report a wider circulation in the borough, Dr. Charles S. Thomson has seized the opportunity to provide in it a lot of useful information for the public. The report is illustrated with photos descriptive of the maternity and child welfare work, including pictures of breast-fed babies, a healthy contented-looking mother with her recently weaned fourteenth baby of 11 months old, the Princess Louise Infant Welfare Centre, and the Municipal Maternity Home with its grounds. The report contains interesting articles on the prevention of cancer, the insulin treatment of diabetes, the science of milk production, and the prevention of rheumatic heart disease in children in the preparation of which Dr. Thomson has received the collaboration of several well-known physicians. Dr. Thomson has made another new departure by addressing a letter to his colleagues in practice on the subject of chronic rheumatism, which has evoked some interesting replies as to its ætiology, prevalence, and treatment. His report should make good reading for the citizens who frequent the public libraries of Deptford. He compliments his council on their efforts re housing, but gives some terrible examples of overcrowding. The report opens with interesting comments on the recent census. The maternity home keeps full, and the endeavour is made to limit the admissions by means of the ante-natal clinic to normal cases and to find hospital accommodation for abnormal cases elsewhere. A tuberculosis care committee is actively at work; the secretary visits all cases before and after sanatorium treatment and the families during the patient's absence from home. A fund is badly needed to help families to tide over these difficult times.

Fulham.

Dr. A. Middleton Hewat submits his first health report for Fulham. During 1922 the Public Health Committee issued to the public leaflets on the early signs and symptoms of cancer. The tuberculosis work is handicapped by the lack of institutional accommodation for infectious cases. Thirty-one cases of puerperal fever were notified with only eight deaths, the low case-fatality being probably due to the excellent arrangement with the Fulham Guardians, by which suspected cases are admitted to the infirmary without waiting for absolute certainty of diagnosis. An outbreak of six cases of typhoid fever occurred in one house in July. The original case was probably of the ambulant type and prepared the food for the subsequent cases, but the mode of infection of the original case was not discovered. The tuberculosis care committee is able to do good work in arranging for the families of patients removed to a sanatorium, thanks to the excellent organisation of social work in Fulham. Six of the 642 samples of milk were coloured with annatto. Full particulars of the working of section 28 of the Housing, Town Planning, &c., Act, 1919, are given. This section gives the sanitary authority power to do work necessary to render a dwelling-house "in all respects reasonably fit for human habitation" in the default of the owner. The statement shows the great difficulties in which the sanitary authority become involved in their subsequent effort to recover the cost from the owner. The time given in the notice must be reasonable, the exact details of the work required must be given, the owner may apparently appeal to the magistrates at any stage on any point, even if he has neglected his primary right to appeal to the Ministry of Health, &c. The Fulham Council have brought the unworkable nature of the section to the knowledge of the Ministry and it is not surprising to learn that in future they will only use this section in most exceptional cases.

Hampstead.

Dr. Frank E. Scrase reports that Hampstead maintains its position as a healthy urban district. Nevertheless it does not escape a high death-rate from cancer, a high mortality-rate among illegitimate infants, and, for 1922 at any rate, a high maternal death-rate from childbirth. Dr. Scrase points out the need for an institution for advanced cases of consumption and for an open-air school for delicate and suspected children. There is a representative tuberculosis care committee. The need for definite action regulating the use of preservatives is emphasised. The Hampstead Council do not do work in default of the owner under section 28 of the Housing, &c., Act, 1919, but serve notices on recalcitrant owners under the Public Health Act. Dr. Scrase points out that the comparison of the census of 1921 with that of 1911 shows that the density of population in the smaller-sized tenements is increasing, with the inevitable result of much undesirable mixing of the sexes after adolescence.

Kensington.

In his comments on the census, Dr. James Fenton shows that, while in the County of London there are 116 females to 100 males, in Kensington there are 159 females to 100 males, and in South Kensington more than twice as many females as males. Ten cases of puerperal fever were notified with six deaths, and a determined effort is being made to get cases removed to St. Mary Abbot's Hospital at an earlier stage of the disease. Cases will be admitted in future as "suspects" and the question of notification left in the hands of the medical superintendent. Since April 1st, 1923, the whole of the tuberculosis work has been centred at the North Kensington Dispensary, as it has been found that the Brompton Hospital, which formerly acted as the dispensary for South Kensington, could not conveniently do the preventive work in connexion with contacts, suspects, &c. Dental treatment is provided for expectant and nursing mothers at each of the seven voluntary infant welfare centres. The ante-natal centre opened by Queen Charlotte's Hospital authorities in June, 1921, was attended by 1028 mothers. The sanitary control of houses let in lodgings is one of the most difficult problems in Kensington. About one-fifth of the 27,000 houses in the borough are let in lodgings, and these houses, originally intended for one family, may now contain up to seven or eight families and have undergone no special adaptation for the purpose. The borough council are anxiously waiting for the new by-laws for this class of house which have been under the consideration of the London County Council for the last two years.

Paddington.

Dr. Reginald Dudfield's report contains a large amount of interesting statistical information. A comparison between the triennium of 1910–12 and that of 1920–22 shows a large increase in the mortality of males aged 15–25, which is in marked contrast with the reduced mortality at other age-periods. Dr. Dudfield is convinced that child welfare work has reduced the mortality during the first year, but that is not enough, he says, and at present no evidence can be adduced to show definitely that the survivors are reared with a good prospect of a healthy after-lifetime. The cancer mortality during 1922 showed an unusual feature—viz., an increase in the male and a decrease in the female rate, the figures being 1·52 and 1·16 respectively. The ratio of homes of less than five rooms to all homes at the last four census reports has been 63·2, 64·8, 70·2, and 77. Although there has been this increase in the proportion of small homes the density per room has decreased. Thus, since 1901 the number of persons per one-roomed house has improved from 1·83 to 1·60, per two-roomed house from 1·69 to 1·57, per three-roomed house from

1·27 to 1·17, per four-roomed house from 1·15 to 0·95, and per five-roomed house from 1·40 to 1·23. Like Dr. Hewat, Dr. Dudfield comments on the unworkability of Section 28 of the Housing Act of 1919 for getting repairs done, and, like Dr. Fenton, he anxiously awaits the new by-laws for tenement houses. No less than 18 out of 67 samples of milk taken at the G.W.R. terminus were found to be adulterated (26·9 per cent.).

Poplar.

Dr. Frederick W. Alexander's report gives the usual statistics, including those of the three sub-districts of Poplar, Bromley, and Bow. During the year about 56,000 gallons of electrolytic disinfectant fluid were manufactured at a cost of 1*s.* per ten gallons. This is diluted to half strength before distribution. It is used for the three public baths in the strength of 1 part of chlorine per two million parts of water, the total amount supplied to the baths being nearly 9000 gallons. During 1922 18,082 applications for free milk were received, of which 16,215 were granted at an approximate cost of £8500. The report of the chief health visitor mentions that the mortality among "toddlers" was very heavy. Comparing with the previous year, the mortality during the second and third years of life was more than doubled, during the fourth year almost doubled, and during the fifth year slightly decreased. The increase is accounted for by deaths from respiratory diseases in the early months of the year.

St. Marylebone.

Dr. Charles Porter in a foreword to his report describes what is done to bring home to the individual the fact that hygiene is not all communal by means of various "weeks," such as Baby week, Health week, and Rat week, by congresses, by lectures, by leaflets and posters, and by the helpful coöperation of the press. There are now only 12 cows kept in the borough. The borough council have on more than one occasion represented to the Ministry and to the London County Council the need for the registration of premises, in which meals are provided or food is sold ready cooked, or is prepared for sale, but up to the present no action has been taken by either of these authorities. A case which was suspected to be typhus fever occurred in November, and was removed to the North-Western Hospital. The usual precautions as to disinfection, &c., were taken, and no further case occurred. The patient recovered, and the nature and cause of the illness remained obscure. At the end of the year, though a great part of the site for the Council's housing scheme had been cleared, the approval of the Ministry to the scheme had not been obtained. A liquid known as "Fluid D" is being tried for the spraying of verminous premises, and up to now the results have been fairly satisfactory. Dr. Porter's report opens with interesting local information obtained from the census returns.

St. Pancras.

Dr. T. Shadick Higgins, who has now taken up his work at Capetown, submits his tenth and farewell report. The death-rate was higher than in the three preceding years, partly owing to influenza in the first quarter, and partly owing to measles, which caused 100 deaths of children from January to May. The census shows the unsatisfactory state of housing. More than half the families live in tenements of one or two rooms. The dwellings occupied by one family number 9975, and those occupied by more than one family 14,685. For the 56,653 families in the borough there are only 24,660 structurally separate dwellings. The borough council dental clinic for mothers and children at the British Dentists' Hospital was continued. A weekly treatment clinic is held at the St. Pancras dispensary for mothers and children referred from the centres. The council make a grant of £500 in aid of the Mayoress of St. Pancras home for ailing children under school age. Government grants are received by 21 institutions in the borough, amounting, with the grant to the borough council, to over £14,000. An outbreak of scarlet fever occurred at the Foundling Hospital There were 140 cases of mild type and no deaths. In view of other epidemics in the past and for every reason Dr. Higgins thinks the governors should carry out their scheme for removing the children to the country as soon as possible. The housing situation is perhaps the gravest problem in St. Pancras. Closing orders cannot be made. Underground sleeping rooms, formerly closed, are now in use. Dr. Higgins regrets the delay in dealing with the "truly awful conditions" in one of the unhealthy areas in Somers Town, but the Ministry state that in the opinion of the London County Council there are other areas even more urgently requiring attention, and suggest that the borough council might proceed without financial assistance from the State.

Southwark.

Dr. George Millson reports a higher death-rate than for the three preceding years, the deaths from influenza, measles, and whooping-cough all being numerous. Free milk was supplied to mothers and children at a cost of £2300. There is in Southwark a large number of labourers and unemployable persons, and the outlook is not promising in this respect, as many of the boys are not attached to a trade. Two cases of anthrax were notified, contracted from Chinese skins. Both were treated by excision and Sclavo's serum at Guy's Hospital and recovered. Measles is notifiable, and so is epidemic diarrhœa in July, August, and September. Nurses are engaged by the council to attend to these diseases. A municipal nursery was opened in January and had an average daily attendance of 40.

Westminster.

Dr. Francis J. Allan reports that the housing problem is slowly solving itself, many residents in Westminster having been enabled to move nearer their work in the suburbs. Although the Westminster Council has not built any houses recently, its contribution to the County Council scheme for providing 29,000 new dwellings (exclusive of those erected on cleared insanitary areas) during the five years from January, 1920, and to other building schemes in the metropolis amounts to £32,000 per annum. The Peabody Trust has completed nine blocks in Great Peter-street, with accommodation for 95 families, and when the Great Peter-street scheme is completed, a black spot will have been removed from the city. Reduction in cost has made it easier to get repairs done. Each of the last three decades shows an improvement in overcrowding, as judged by the "two to a room" standard. Thus the percentage of the population living more than two to a room at the four last census years was 37·1, 28·5, 21·7, and 15·5. Dr. Allan deals at some length with the addition of chemicals and preservatives to food. Fifty-four of 63 samples of peas, beans, and spinach contained sulphate of copper. The council prosecute successfully as a rule if the amount exceeds 2 gr. per lb., but last year two prosecutions, where this amount was exceeded, were dismissed by a temporary magistrate. Fifteen years ago Dr. Allan induced the French packers to restrict the amount of copper used, and he has now approached the Italian packers, who have newly taken to this business since the war, with a similar object. Two vendors were fined for selling potted shrimps containing 31 and 93 gr. per lb. of boric acid respectively. An informal sample of Russian caviare contained 21 gr. of boric acid per lb. and 7·5 parts of formaldehyde per 100,000. The matter was reported to the Ministry. Subsequent samples taken at Dover and Folkestone contained from 125 to 400 parts of formalin per million. Two consignments were seized at these ports and circular letters sent to dealers, restaurants, &c., warning them against purchasing caviare so treated. As regards preservatives, &c., in food, the Westminster City Council have expressed the view that a committee should be appointed to go into the whole question anew.

Correspondence.

"Audi alteram partem."

OPHTHALMOLOGICAL TRAINING FOR MEDICAL STUDENTS.

To the Editor of THE LANCET.

SIR,—Mr. Percy Flemming's letter in your issue of August 4th touches on a very important point. I agree that the time spent by the average medical student on ophthalmoscopy is practically wasted, in that the actual knowledge obtained will not be of much service in his practice. Even after 20 or 30 years of special practice it is quite possible to be in doubt as to fundus appearances. But, on the other hand, this is not the whole story. The examination of the fundus is not at first easy. The diffident student, if encouraged rather to attend principally to external diseases, may readily give up his place in the dark room to others and not bother about the fundus. But, once he has mastered the technique, this same student may quite possibly receive a stimulus which will make him an enthusiastic ophthalmoscopist for the rest of his life. Is it not, therefore, worth while after all to encourage rather than to discourage practice with the ophthalmoscope, even when one allows that the actual knowledge gained in the student's course is insufficient to enable him to diagnose and treat, in his future practice, unless he becomes a post-graduate student of ophthalmology?

I am, Sir, yours faithfully,

ERNEST THOMSON, M.D.

Stirling, August 18th, 1923.

THE IMPERIAL CANCER RESEARCH CAMPAIGN AND THE CANCER PROBLEM.

To the Editor of THE LANCET.

SIR,—I have just seen Dr. J. A. Murray's letter in your issue of August 18th. I am quite aware that the British Empire Cancer Campaign is distinct from the Imperial Cancer Research Fund, and I do not think my letter would lead anybody to suppose that they were identical. I am also aware that the latter has been in existence for 20 years, and that the former has not yet become established. My statement that the Treasury grant to the Imperial Cancer Research Fund is utterly inadequate would be quite correct if the word "Fund" were left out. That, of course, was my clerical error. I do not know who was guilty of the libel referred to in the last paragraph of Dr. Murray's letter. As far as I am concerned I never made such a suggestion or wrote anything that would bear that construction.

I am, Sir, yours faithfully,

Blackpool, August 22nd, 1923. LEONARD MOLLOY.

X RAYS IN EXOPHTHALMIC GOITRE.

To the Editor of THE LANCET.

SIR,—My experience of the value of X rays in the treatment of exophthalmic goitre, as recorded in my recent paper, has not met with universal acceptance. I can merely state that I have recorded my actual observations, and that it is quite possible that further experience may lead me to alter these views. It has been stated that the X ray treatment of my cases has been very badly administered as shown by the presence of scars, burns, and even of carcinoma. This is, of course, correct, but it is only fair to my colleagues at the London Hospital to explain, what was perhaps not clear in my paper, that these bad results were seen in cases that came to me because they were dissatisfied with the X ray treatment. They had come from all parts of England, and the X rays had been administered in many different clinics. Not one had received this treatment at the London Hospital. The fact remains, however, that although such treatment should be safe it is in practice associated with very grave dangers, which are likely to increase if the method is widely adopted. In the London Hospital clinic there have, of course, been no burns, but the heads of this clinic have not been at all satisfied with the results of treatment as applied to my second and third groups.

I am, Sir, yours faithfully,

A. J. WALTON.

Devonshire-street, W., August 20th, 1923.

SCHOLARSHIP IN MEDICINE.

To the Editor of THE LANCET.

SIR,—Sir Henry Morris has in an article on Scholarship and Medicine (THE LANCET, August 11th) called attention, seemingly with approval, to a letter in the *Times* in which I pleaded for a liberal classical preliminary education for medical students. I adduced the great names of Harvey, Sydenham, and Hunter in support of a freer, wider outlook—men who dealt with life as well as disease.

Sir Henry Morris and Dr. Peachey, in a reply to me, revive and advocate as a scholar the name of a general practitioner—Francis Adams. I am content with their championship. But this excerpt is not uninteresting. Wickham Legg, writing of Samuel Gee and himself, says:—

"We had both been brought up in what may be called the school of Francis Adams. The real Hippocrates could be distinguished from the pseudo-Hippocrates—the residue was unworthy of the father of medicine. The 'Aphorisms' were the right Hippocrates . . . and the other writings decided by their approach to the 'Aphorisms.' With some satisfaction Gee told me a papyrus had been found in which a list of his writings was given, and in the list were the treatises considered the most foolish of all."

I have trespassed on your space in my contention, but may I quote from Gee?

"The learned physician is almost extinct. I am sorry for it, because the rank which the profession takes in the world depends chiefly upon its physicians."

I am, Sir, yours faithfully,

RICHARD GILLBARD.

Willesden Green, N.W., August 26th, 1923.

A NATIONAL PATHOLOGICAL MUSEUM.

To the Editor of THE LANCET.

SIR,—With the recommendation made by Dr. E. H. Shaw in his letter in THE LANCET, August 18th, p. 364, I agree fully; a permanent museum of microscopic pathological specimens could hardly fail to be of service both for practice and for medical education. I have elsewhere advocated that an exhibition of microscopic specimens be held with a view to clearing away the mystery that still pervades the pathology of the commoner malignant tumours of man. Although some recondite biological points are involved, the immediate causal agents are easily recognisable in certain common human cancers and sarcomas, and in the process important misconceptions in general biology are corrected.

Results obtained by Carrel and Burrows about thirteen years ago showed that in culture tissue cells live and multiply almost without limit; whereas in the body their life is relatively short. Carrel remarked on the presence of the characteristic cell inclusions, &c., in his cultures of human cancer tissue, but he could not decide what they were. If mouse cancer and Fibiger's rat cancer are the same disease as the common human cancers and sarcomas, they must contain the same cell inclusions, &c., in the same relation to the tissue cells. At present the diagnosis of cancer is histological, not causal, as is that of tuberculosis. Very different causes may produce anatomical changes that require close examination for their differentiation. In many human cancers and sarcomas, such as rapidly growing squamous epithelioma and large-celled sarcomas, it is easy to see that the cell inclusions are phases of protists, which

account for about one-third of the weight of the tumours. If any doubt remained, examination of molluscum corpuscles in water cultures would clear it away.

I recommend the organisation of an exhibition of microscopic preparations of human cancer and sarcoma, and of cancer and sarcoma of rats, mice, and of birds; of molluscum, variola, and syphilis; of genital tumours of dogs, and of related lesions of animals and plants. Further, that in the exhibition space should be reserved for the demonstration, in water cultures of molluscum, of streaming, budding, and other vital changes in the corpuscles. I should be happy to show sections and other preparations that I have described from 1892 onwards, and to place published drawings beside the microscopes. Such an exhibition should be kept open for at least three months, and better for a year. In this way only can be created a wide educated opinion based on visible objects. At the close of the exhibition the more illuminating specimens could be selected to form part of a permanent collection such as Dr. Shaw has recommended.

I am, Sir, yours faithfully,

J. JACKSON CLARKE.

London, W., August 17th, 1923.

DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

To the Editor of THE LANCET.

SIR,—The outbreak of small-pox in England reported in your issue of June 23rd is of great interest from many points of view, particularly that of diagnosis. To some of us who live abroad in the midst of native communities small-pox becomes part of our everyday experience, and a note on the differential diagnosis of chicken-pox and small-pox as followed by the Asansol Mines Board of Health, Bengal, with very satisfactory results may be of interest to practitioners at home.

The Asansol Mines Board of Health was established by Bengal Act II. of 1912 (the Bengal Mining Settlements Act) to prevent "the outbreak and spread of dangerous epidemic disease" in the coal mines of Bengal. The "dangerous epidemic" diseases referred to are small-pox, cholera, and plague, the former two of which had up to the time of the passing of the above-mentioned Act taken such an annual toll of life of the mining population as seriously to imperil the continued existence of the mining industry. Plague is, however, unknown in the Asansol mining settlement, which is 413 square miles in area and includes 202 collieries, 491 villages, and the two municipalities of Asansol (population 21,727) and Raniganj (population 14,536). The total population of the settlement according to the census of 1921 is 329,353.

Under the Act every mine-owner and manager is bound to furnish to the Mines Board of Health "immediate information of any case or suspected case of small-pox, cholera or plague." This clause, however, was found in practice to be inoperative as far as small-pox was concerned, since the majority of the Doctor Babus employed by collieries—on whom the duty of informing managers of the occurrence of such cases ordinarily devolves—persistently refused, either through negligence or ignorance, to recognise small-pox when it occurred, diagnosing all such cases as "chicken-pox" and thus avoiding the legal obligation of notifying the cases to the Mines Board of Health. It was therefore necessary to circumvent such ignorance and neglect of duty on the part of the Doctor Babus, and orders were accordingly issued by the Board that "all sickness accompanied by an eruption of vesicles" must be notified as small-pox. This order had the effect of securing the notification of all cases both of small-pox and chicken-pox as small-pox, and it became necessary therefore to select if possible some easily recognised and constant diagnostic point of difference between the two diseases, to enable the sanitary inspecting staff of the Board—who possess no medical training—to report on inquiry the true nature of the disease, and to take the necessary steps to prevent its spread when the case was actually one of small-pox.

On studying the question it was found that it was universally agreed that the eruption of chicken-pox always appears within 24 hours of the onset of fever or malaise. This then was accepted for the use of the inspecting staff as the diagnostic test of chicken-pox, and as experience accumulated it was found that in a considerable proportion of cases the eruption appeared even before the onset of fever. All cases where a vesicular eruption appeared later than 24 hours after the onset of fever were ordered to be regarded as small-pox and steps to be taken for the isolation of the cases and for the wholesale revaccination and vaccination of contacts. On the form provided by the Board for the notification of small-pox two additional headings were then introduced—one being the "Date of onset of fever" and the other the "Date of outbreak of eruption," with a view to discover the usual time of eruption of the two diseases, and it was found on analysis of many hundreds of cases that the eruption either came out on the same day as the onset of fever or else did not appear until *after a well-defined interval* of at least 48 hours, no vesicular eruption ever appearing during the second 24 hours. It therefore became evident that two vesicular eruptive fevers existed, one characterised by an eruption appearing within 24 hours of the onset of fever or malaise, and the other by the non-appearance of any eruption until after the lapse of at least 48 hours. The former of these diseases, moreover, was constantly seen to have the diagnostic features of chicken-pox as described in the standard text-books, and the latter those of small-pox. In all cases, moreover, whether of chicken-pox or small-pox, there was to be obtained on careful inquiry from the patient or the relatives a definite history of fever, sickness, or malaise, however slight or fleeting, upon which to calculate the time of the appearance of the eruption. The time of the appearance of the eruption has therefore been adopted in the Asansol mining settlement as the crucial diagnostic test between chicken-pox and small-pox, and I feel no diffidence in recommending it to all those in doubt about the differential diagnosis of the two diseases.

In conclusion, I would add that an epidemic vesicular eruption unaccompanied by constitutional disturbance or physical disability of any kind may be safely left for diagnosis to the dermatologist and need not occupy the serious attention of the medical officer of health.—I am, Sir, yours faithfully,

J. W. TOMB, O.B.E., M.D., D.P.H.,
Chief Sanitary Officer, Asansol Mines Board of Health.

Asansol, Bengal, India, July 19th, 1923.

SPASM OF THE LARYNX.

To the Editor of THE LANCET.

SIR,—In the condensed report of the discussion on this subject in the Section of Laryngology and Otology (THE LANCET, August 18th, p. 359), I am credited with associating laryngitis stridulosa with rickets. I need hardly say that in this I am incorrectly reported, and that my insistence was on the well-known association of laryngismus stridulus ("spasm of the larynx") with rickets, and on its distinction from laryngitis stridulosa (sub-glottic laryngitis or common croup). My reference to the production of closure of the glottis and restoration of voice in some cases of functional aphonia by faradisation of the lingual tonsil was only apposite to the question under discussion in so far as it suggested a particularly sensitive "motor point" for the glottis-closers. It supported Mr. Mark Hovell's contention as to the rôle of the lingual tonsil in the production and treatment of spasmodic laryngeal cough. I am, Sir, yours faithfully,

London, August 22nd, 1923. JAMES DUNDAS-GRANT.

A DEFENCE OF THE FORAMEN OF MAGENDIE.

To the Editor of THE LANCET.

SIR,—In THE LANCET of June 9th, which has just arrived in Adelaide, is an article on the Choroid Plexuses of the Brain which, as is ever the case with the writings of Sir John Bland-Sutton, has a strong appeal to lovers of Hunterian anatomy. But I notice that, in speaking of the foramen of Magendie (p. 1145), Sir John Bland-Sutton says: "This foramen has had such charm for teachers that it maintains a place in text-books, although sealed up by practical anatomists many years ago." As a teacher I freely admit the charm of this foramen, and as a practical anatomist I also regard it with affection, for of its presence in the undisturbed condition of the roof-plate of the fourth ventricle I have no doubt whatever.

I am, Sir, yours faithfully,

F. WOOD JONES,
Elder Professor of Anatomy in the University of Adelaide.

Adelaide, July 17th, 1923.

HEART DISEASE IN EARLY LIFE

To the Editor of THE LANCET.

SIR,—The recent discussion on this subject by the British Medical Association (THE LANCET, August 18th, p. 355) is valuable as showing grave divergencies of opinion with regard to the treatment of this important affection. One recommends the persistent use of salicylate "in the hope of preventing recrudescence of infection." Another says "treating rheumatism by pharmacopœial doses of salicylate is only playing with a serious disease." A third remarks "agreement was general as to the value of salicylate," whilst Dr. J. G. Emanuel, of Birmingham, holds that salicylate had not diminished the incidence of carditis.

Surely it is time that the profession were in a position to speak with authority on this matter, so as to prevent any further abuse by this powerful poison. Opium is valuable to relieve pain, but if relief of pain obscures symptoms at the same time, then opium is not a good drug. Salicylates relieve pain and reduce temperature, but is this all to the good? The reduction of temperature is at the expense of a very great blood disturbance, and the pushing of salicylates is responsible for many serious results. The time has arrived when a Commission should be appointed to investigate the whole problem of heart disease, and evidence taken from all parts, so as to determine once and for all the chief cause of this great national curse.

I am, Sir, yours faithfully,

G. ARBOUR STEPHENS,
Consulting Cardiologist, King Edward VII. Welsh National Memorial Association.

Swansea, August 20th, 1923.

REST AND EXERCISE IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—Following Dr. C. Lillingston's article on the Treatment of Early Pulmonary Tuberculosis in the Young Adult, published in your issue of Jan. 13th, much correspondence has arisen on the relative values of treatment by rest and by graduated exercise, on the whole to the condemnation of the latter. As far as the wage earner is concerned, the ideal of treatment is firstly to encompass the cure or arrest of the lesion, and secondly to fit the patient, both physically and mentally, to resume his original occupation. Immobilisation, as far as this can be effected in the case of the lung, is admittedly the first essential for the former end, but I submit that carefully graded exercise is almost as essential for the latter. In the case of working-class patients about three months of sanatorium treatment is usually allowed, but few patients can be graded in that time up to the standard of work they will have to perform when they are discharged, unless the patients are carefully selected cases and have been under efficient observation previously. A large number of working-class patients sent to sanatoria are not early cases.

Exercise is very difficult to graduate. The actual amount of work can be measured more or less accurately, but the effort necessary to perform it, and therefore, presumably, the degree of autoinoculation, varies with circumstances—e.g., atmospheric temperature, exposure to sun, previous aptitude for the type of work, &c. The doctor should supervise all the work of his patients, and, if he is able, should work with them. Patients appreciate this, and only in this way can he estimate the effort required to perform the work. Instructors can never replace the doctor, and are liable to be regarded by the patients as foremen whose business it is to get a piece of work done.

One doctor, if he acts in this way, can only supervise the work of a strictly limited number of patients, at the most 60. Most patients whom it has been possible to train and treat by graduated labour whilst in sanatoria are improved when they leave. Many subsequently relapse, because they return to the same conditions which were responsible for their breakdown, and they are probably unable to carry out the routine which they have been taught. In addition, many have to resume work which is far too strenuous, in order to gain some sort of livelihood, and even then are unable to procure sufficient food.

I am, Sir, yours faithfully,

Oxford, August 20th, 1923. W. E. WALLER.

PENSIONS IN THE INDIAN MEDICAL SERVICE.

To the Editor of THE LANCET.

SIR,—The fact that the more recent advertisements for recruitment to the Indian Medical Service differ vitally from those of the previous years does not appear to have attracted notice. The difference consists in the addition of a paragraph immediately after the "rates of pensions," which runs as follows: "The above rates are subject to revision after the 1st July, 1924, upwards or downwards, to an extent not exceeding 20 per cent."

As there is no probability of any revision *upwards*, it is perhaps a fair inference that pensioners must be prepared for a loss of 20 per cent. of their income after June next. Fortunately for an officer who entered the Service before July 1st, 1920, his pension will not in any case be reduced below that which he would have received under the old scale. This is a definite promise; vide India Office Memo., dated June 3rd, 1920. But what of those who entered after that date; whose pensions are not due, at the earliest, for another 14 years; and who have no promise beyond the text of the advertisement which attracted them and the regulations with which they were provided? How far down will the revision proceed, and what will be the value of a £400 pension in 14 years' time? Of course, we all know, or should know, No. 1 of these regulations, which is as follows: "(1) The regulations are those in force at the present time. They are subject to *any* alterations that may be determined on." The italics are mine.

I am, Sir, yours faithfully,

August 19th, 1923. I.M.S. (retd.).

ALEXANDRA DAY AT BRIGHTON AND HOVE.—The Alexandra Rose Day collection on August 11th realised close on £1030, and after deducting the expenses (about £200) the remainder has been allocated as follows: Royal Sussex County Hospital, £300; Brighton, Hove, and Preston Dispensary, £85; Royal Alexandra Hospital for Sick Children and the Brighton and Hove Hospital for Women, each £77 10s.; Lady Chichester Hospital, the New Sussex Hospital, and the Throat and Ear Hospital, each £52 10s.; Sussex Eye Hospital and the Queen's Nurses, each £35; Surgical Aid Society, £17 10s.; Clayton and Keymer Nursing Association, £10; and the Brighton Dental Hospital, £5.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

Surgery.—E. N. C. Annis, Guy's Hosp.; E. E. E. Attale, St. Thomas's Hosp.; A. Cawadias, Paris; H. S. Chadwick, Manchester; H. T. Chiswell, Guy's Hosp.; C. J. Fox, St. Mary's Hosp.; K. P. Hare, Univ. Coll. Hosp.; G. A. Lord, Manchester; H. MacLachlan, Guy's Hosp.; M. A. E. Somers, Bristol; and J. N. Wheatley, London Hosp.

Medicine.—E. E. E. Attale, St. Thomas's Hosp.; A. Cawadias, Paris; J. H. Cooper, Glasgow; J. B. Couche, Toronto; J. Crawford, Royal Free Hosp.; C. J. Fox, St. Mary's Hosp.; K. P. Hare, Univ. Coll. Hosp.; and M. S. Mahmud (Sect. II.) and W. R. H. Pooler, St. Mary's Hosp.

Forensic Medicine.—E. E. E. Attale, St. Thomas's Hosp.; A. Campbell, Edinburgh; A. Cawadias, Paris; and K. P. Hare, Univ. Coll. Hosp.

Midwifery.—E. E. E. Attale, St. Thomas's Hosp.; E. N. C. Annis, Guy's Hosp.; A. Cawadias, Paris; H. S. Chadwick, Manchester; R. S. Chambers, Guy's Hosp.; K. P. Hare, Univ. Coll. Hosp.; G. A. Lord, Manchester; Y. Nandan Lal, Dundee; H. J. Powell, St. Mary's Hosp.; and J. N. Wheatley, London Hosp.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: E. E. E. Attale, A. Cawadias, H. S. Chadwick, and K. P. Hare.

CONJOINT BOARD R.C.S. ENG., R.C.P. LOND.: ADMISSION TO FINAL EXAMINATION.—These regulations have now been revised as follows, being slightly different from those given in the Students' Number of THE LANCET last week. Students of recognised universities in England, Scotland, and Ireland, who have passed examinations for a degree in Medicine at their universities in the subjects of the First and Section I. of the Second Examination of the Examining Board, may enter for the Final Examination at the expiration of 30 months from the date of passing in anatomy and physiology on production of the required certificates provided they do not complete the examination before the expiration of five years of study. Members of certain recognised India, Colonial, and Foreign universities who have passed examinations for the Degree of Doctor or Bachelor of Medicine or Surgery in the subject of the First and Section I. of the Second Examination of the Examining Board may present themselves for the Final Examination under special conditions.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH: PARKIN PRIZE.—In terms of the bequest made to the College by the late Dr. John Parkin, Fellow of the College, a prize is offered for the best essay on certain subjects connected with medicine. The subject of the essay for the present period is, in terms of the deed, "On the curative effects of carbonic acid gas or other forms of carbon in cholera, for different forms of fever and other diseases." The prize is of the value of £100 and is open to competitors of all nations. Essays intended for competition, which must be written in the English language, to be received by the secretary not later than Dec. 31st, 1923. Each essay must bear a motto, and be accompanied by a sealed envelope bearing the same motto outside and the author's name inside. The successful candidate must publish his essay at his own expense, and present a printed copy of it to the College within the space of three months after the adjudication of the prize.

UNIVERSITY COLLEGE HOSPITAL.—A festival dinner will be held on Nov. 20th in connexion with the Rockefeller Foundation Gift to the Medical School, when Prince Henry will preside. It will be remembered that the condition of the bestowal of the Rockefeller gift imposes heavy additional charges upon the hospital connected with the Medical School. The festival dinner is intended to inaugurate a campaign to raise £500,000.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Special courses in general medicine and surgery, cardiology, dermatology, diseases of children, ophthalmology, proctology, &c., have been arranged up to June, 1924. The programme for September will include a two weeks' course in general medicine and surgery at the Hampstead General Hospital in conjunction with the Hospital for Epilepsy and Paralysis, Maida Vale, the North-Western Fever Hospital, and Paddington Green Children's Hospital, from Sept. 10th to 22nd. There will also be a special course on infants' diseases at the Infants Hospital from Sept. 3rd to 21st, a course in ophthalmology at the Central London Ophthalmic Hospital, from Sept. 3rd to 29th, and a course in dermatology at St. John's Hospital for Diseases of the Skin, from Sept. 17th to Oct. 13th. For particulars apply to the Secretary, Fellowship of Medicine, 1, Wimpole-street, W. 1.

ST. MARY'S HOSPITAL.—The annual dinner of the past and present students of St. Mary's Hospital Medical School will take place at the Connaught Rooms, Great Queen-street, London, W.C., on Monday, Oct. 1st, at 7 for 7.30. Mr. V. Warren Low will be in the chair. The hon. secretary is Dr. Hope Gosse.

MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.—A work by Mr. M. W. Hilton-Simpson, entitled "Arab Medicine and Surgery," was published about a year ago, and reviewed in our issue of Oct. 7th, 1922 (p. 766). Mr. Hilton-Simpson has presented the instruments figured and described in his book to the Museum, where they are now on view. They were used by the Shawiya, a Berber tribe, living near Biskra.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN.—The following appointments have been made:—Consultant Physicians: Sir Malcolm Morris and Dr. James H. Stowers. Hon. Physicians: Dr. Wilfrid Fox and Dr. Henry MacCormac. Director of the Pathological Department: Dr. J. M. H. Macleod. Sir Malcolm Morris and Dr. Stowers have accepted seats on the Board of Management.

LONDON MEDICAL EXHIBITION.—This exhibition, the thirteenth of the series, will be held at the Central Hall, Westminster, S.W., from Oct. 1st to 5th. It will be remembered that admittance is confined to the medical profession, members of which resident within 50 miles of London receive cards. Other medical men desiring to take this opportunity of inspecting the exhibits in the medical, hygiene, dietetic, surgical, optical or dental sections can obtain cards on application to the Secretary at 191, Bishopsgate, London, E.C., or at the Central Hall during the exhibition week.

CANCER RESEARCH IN MANCHESTER.—In view of the recent gifts to the Christie Hospital for this purpose, announced in THE LANCET of August 18th (p. 367), it is interesting to record what has been done in Manchester in relation to the study of this disease. Mrs. Alfred Pilkington placed a sum of money in the hands of trustees to constitute the Pilkington Fund for this purpose, and in 1906 the systematic study of cancer was begun. The original sum has been supplemented from time to time. Dr. Charles Powell White was appointed to carry out research, and the University granted suitable accommodation for this purpose in the pathological department. In the deeds of foundation of the Christie Hospital, the investigation of cancer was one of the objects stipulated by the founders. From 1911 the stipend of the pathologist has been provided jointly from the Pilkington Fund and the Christie Hospital. In 1912 a legacy from Miss Helen Swindells enabled the University to equip a separate laboratory for cancer research, and to provide the expenses for its upkeep.

LAURA SPELMAN ROCKEFELLER MEMORIAL.—In our issue of August 18th (p. 345) we gave an account of the work of the Rockefeller Foundation. Another avenue of Mr. John D. Rockefeller's generosity, perhaps little known in this country, is the Laura Spelman Rockefeller Memorial, founded in October, 1910, in memory of his wife. The memorial is incorporated for general charitable and philanthropic purposes, and is not limited geographically in its field of operations. The principal of the fund, as well as its income, may be used by the trustees in forwarding its humanitarian activities. The assets at the end of 1922 amounted to $78,074,773. During the period beginning with the Memorial's incorporation up to December, 1922, $9,361,871 had been paid on account of appropriations made by the trustees, and a sum of $3,486,888 awaits the fulfilment of conditions for payment. From 1919 to 1922 organised relief in Europe and China received a considerable proportion of the income; non-secretarian social welfare organisations—the Y.M.C.A. and Y.M.W.A. in the United States, colleges in the Near East for education, &c.—received large sums. The various social welfare organisations during four years received over $3,299,345, while for education during the same period $801,222 were allocated. For scientific research and investigation—including the study of negro life and history, Bureau of Vocational Information, and Curie Radium Fund—$50,500, and for public health, which included contributions to many American institutions dealing with child hygiene, control of cancer, tuberculosis nursing, and maternity, $693,050 were spent during the last four years. The percentage of expenditure for public health will probably decrease in the future, not because the trustees are less convinced of the value of measures of public health in advancing human welfare, but because they feel that since the interest in and support for health enterprises are spreading widely, they may wisely turn their attention gradually to the development of less cultivated fields.

DONATIONS AND BEQUESTS.—Mr. Robert Matthews, of Heaton Mersey, near Manchester, formerly a director of Sir Joseph Whitworth and Co., bequeathed £100 each to Carlisle City Infirmary, Newcastle-on-Tyne, Royal Victoria Infirmary, St. Mary's Hospital for Women and Children, the Pendlebury Hospital for Children, Manchester, Manchester Royal Infirmary, Dr. Barnardo's Homes, and Lord Mayor Treloar's Homes for Crippled Children.—Mr. R. Greenough, of Leigh, Lancashire, left £500 to the Leigh Infirmary.—The Manchester Children's Hospital during the past month has received donations and subscriptions amounted to £187.—The Ancoats Hospital Committee, Manchester, received £1009 as the proceeds of Daisy Days and the parade which took place in June. The Daisy Days show an increase of £281 over the figures for 1922. The Hospital Sunday Fund in aid of the Manchester and Salford Medical Charities realised £14,000; the principal grants apportioned are as follows: Manchester Royal Infirmary, £3569; Salford Royal Hospital, £1510; Ancoats Hospital, £1468; Children's Hospital, Pendlebury, £1362; St. Mary's Hospitals for Women and Children, £1327; Royal Eye Hospital, £1007; District Nursing Institution, £730; Hospital for Incurables, £706; Hospital for Consumption, £511; Memorial Jewish Hospital, £462; Northern Hospital, £315; and the smaller hospitals lesser sums in proportion.

ROYAL MEDICAL BENEVOLENT FUND.—At a meeting of the committee, held at 11, Chandos-street, Cavendish-square, W., 36 cases were considered and £285 18s. voted to 22 applicants. The following were new cases relieved:—

Daughter, aged 41, of M.R.C.S. who practised at Clifton and died in 1913. She started as a children's nurse in December, 1922; in June, 1923, it was found that her lungs were affected. She is now in a sanatorium and asks the Fund to help with maintenance. Her father died leaving a bankrupt estate. Voted £18 18s. for sanatorium treatment.

Widow, aged 64, of M.D., F.R.C.S. who practised in Staffordshire and died in 1891. Applicant has a little house property which brings in about 38s. per week and her rent amounts to 14s. per week. She has been suffering from diabetes for years and is now in hospital under treatment at £1 1s. per week. She asks the Fund to help her as she has to pay a debt of £194 incurred for sanitary work apart from doctor's and chemist's bills. Voted £10.

Widow, aged 74, of L.S.A., L.R.C.P. who practised in London and died after a short illness in February last. House and furniture had to be sold, and after mortgage had been paid and all expenses applicant estimates that her income will not exceed £35 per annum. At present her board and lodging costs 35s. per week. Voted £18 in 12 instalments.

Widow, aged 53, of M.B. who practised in Poplar and South Africa and died in 1912. Applicant, owing to physical inability, is unable to do private nursing continually. She has maintained and educated her daughter and is now hoping that her daughter will be able to secure a post. Applicant has received £86 from nursing, and pays 15s. per week for rent. Voted £10 in two instalments.

Subscriptions may be sent to the hon. treasurer, Sir Charters Symonds, at 11, Chandos-street, Cavendish-square, London, W. 1.

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POSITION PAGES.—Terms on application.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE, SPECIAL COURSE IN INFANTS' DISEASES, at the Infants Hospital, Vincent-square, Westminster, S.W.

MONDAY, Sept. 3rd.—2–3.30 P.M., Dr. William Robinson: Summer Diarrhœa. 4.30–6 P.M., Dr. Eric Pritchard: General Principles in the Feeding of Infants.
TUESDAY.—2–3.30 P.M., Dr. Eric Pritchard: Tuberculosis in Infants. 4.30–6 P.M., Dr. Helen Mackay: Demonstration, Lumbar Puncture, and Examination of Cerebro-spinal Fluids.
WEDNESDAY.—2.30–3.30 P.M., Dr. Helen Mackay: After-effects of Diseases of the Central Nervous System. 4.30–6 P.M., Dr. Bertram Shires: Demonstration in X Ray Department; Diagnosis in Infancy.
THURSDAY.—2–3.30 P.M., Dr. Donald Paterson: Cases of Indigestion and Examination of Stools. 4.30–6 P.M., Dr. William Robinson: Respiratory Disease in Infants.
FRIDAY.—2–3.30 P.M., Dr. Eric Pritchard: Round Table Consultation. Cases in Out-patient Department. 4.30–6 P.M., Dr. Donald Paterson: Lecture and Demonstration: Cœliac Disease.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY, Sept. 3rd.—10 A.M., Mr. Maingot: Surgical Pathology. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards.
TUESDAY.—10.30 A.M., Dr. Paterson: Medical Wards. 12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Sinclair: Surgical Out-patients.
WEDNESDAY.—12 noon, Mr. Sinclair: Abdominal Surgery (Lecture). 2 P.M., Mr. Gibb: Eye Dept. 3 P.M., Dr. Pernet: Skin Dept.
THURSDAY.—12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. MacDonald: Genito-Urinary Dept. 3 P.M., Dr. Scott Pinchin: Medical Out-patients.
FRIDAY.—10 A.M., Mr. Dudley Buxton: Dental Dept. 2 P.M., Dr. Burrell: Medical Out-patients. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept.
SATURDAY.—10 A.M., Dr. Paterson: Medical Diseases of Children.
Daily, 10 A.M. to 6 P.M. Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departs.

Appointments.

ARMSTRONG-JONES, Sir ROBERT, M.D., has been appointed Consulting Physician to the Department of Psychological Medicine, St. Bartholomew's Hospital.
COWAN, A., M.B., Ch.B. Edin., Junior Surgeon, Royal Infirmary, Doncaster.
HUTCHINSON, J. A., M.D., M.S. Durh., to be Certifying Surgeon under the Factory and Workshop Acts for Northallerton.
LINELL, E. A., M.D. Manch., Assistant Professor of Anatomy in Charge of Department of Neurology, University of Toronto.
MCDONALD, J. R., F.R.C.S. Edin., House Surgeon at the Durham County Hospital.
MORTON, R., M.B., Ch.B. Edin., Resident Medical Officer at the Royal Mineral Water Hospital, Bath.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen Royal Infirmary.—Radiographer.
All Saints Hospital for Genito-Urinary Diseases, Vauxhall Bridge-road, and 91, Finchley-road.—Res. H.S. £200.
Birmingham, Queen's Hospital.—Third P. for Out-patients. £50.
Bolton, County Borough of.—Asst. M.O.H., &c. £600.
Bradford, Municipal General Hospital, St. Luke's.—H.P. and H.S. Each £200.
Carnegie Dunfermline Trust, Abbot-street, Dunfermline.—Asst. M.O. £550.
Cheshire Joint Sanatorium, near Market Drayton.—Dental Surgeon.
City of London Maternity Hospital, City-road, E.C.—Res. M.O. £100.
Dreadnought Hospital, Greenwich.—H.S. and H.P. Each £150.
East African Medical Service.—M.O. £600.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. £150.
Glasgow District Mental Hospital, Gartloch.—Jun. Asst. M.O. £350.
Halifax Royal Infirmary.—Third H.S. £150.
Leeds Education Committee.—Asst. School M.O. £500.
London County Mental Hospital Service.—Seventh Asst. M.O. £432.
Manchester Children's Hospital, Pendlebury, near Manchester.—Res. M.O. £120. Also Res. S.O. £80.

Manchester Children's Hospital, Gartside-street.—M.O. and Asst. M.O. £200 and £150 respectively.
Manchester City.—M.O. £632 7s. 8d.
Metropolitan Borough of Woolwich.—Asst. M.O. £400.
Redhill, Surrey, Royal Earlswood Institution.—Jun. Asst. M.O. £250.
Richmond Royal Hospital, Surrey.—Hon. S. to Out-patients.
Royal Naval Medical Service.—Surgeon-Lieutenants.
Royal Northern Hospital, Holloway, N.—H.S. £100. M.O. £150.
St. Mark's Hospital for Cancer and Fistula, City-road, E.C.—H.S. £200.
St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—H.S. £75.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. £100.
Sligo County Board of Health.—County Surgeon. £500. P. £250. H.S. £150.
Sunderland Royal Infirmary.—H.P. £160.
West African Medical Service.—M.O. £660.
West Bromwich and District Hospital.—Res. Asst. H.S. £180.
West London Hospital, Hammersmith-road, W.—H.P.; also two H.S.'s. £100.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments: Cerrig-y-Druidion, Denbigh; Polesworth, Warwick; Staveley, Derby; Bridgwater, Somerset; Harrold, Bedford.

The Secretary of State for the Home Department gives notice of vacancies under the Workmen's Compensation Act, 1906, for County Court Circuit No. 1, and for County Court Circuit No. 57. Applications for the former post should reach the Private Secretary, Home Office, not later than Sept. 8th, and for the latter not later than Sept 19th.

Births, Marriages, and Deaths.

BIRTHS.

CROOK.—On August 17th, at Chiswick-place, Eastbourne, the wife of Dr. A. H. Crook, of a daughter.
MCCALL.—On August 21st, at West Lodge, Leominster, the wife of H. Dundas McCall, M.R.C.S., L.R.C.P., of a daughter.
MURPHY.—On August 12th, at Middlewich, the wife of James Murphy, F.R.C.S. Edin., of a daughter.
WARD.—On August 21st, at Oaklands, Hythe, Southampton, the wife of Dr. G. Humphry Ward, of a son.

MARRIAGES.

DOUGLAS—NEWNHAM DAVIS.—On August 23rd, at St. Mary's Church, Silchester, Arthur McDonald Douglas, M.B., Ch.B. Glasg., to Kathleen, only child of Mr. and the late Mrs. H. Newnham Davis, The Grange, Silchester, Hants.
INKSTER—COX.—At St. Alban's, Holborn, on August 27th, John Inkster, M.D., M.R.C.P., of Middlesbrough, to Olive Mary, daughter of B. H. Cox, Esq., of Toronto.
WHITTLE—FRICKER.—On August 20th, at the Parish Church, Harpenden, Claud Howard Whittle, M.R.C.S., L.R.C.P., M.B. Camb., to Phyllis Lena Fricker, eldest daughter of Guy Carey Fricker, O.B.E., of Harpenden.

DEATHS.

BOSWELL.—On August 22nd, suddenly, John Irvine Boswell, M.D. Lond., J.P., of Crawley Grange, Newport Pagnell, aged 65.
BROOKHOUSE.—On August 20th, at Ashby House, Tweedy-road, Bromley, Kent, Charles Turing Brookhouse, M.D., J.P., aged 76.
GILBERT.—On August 10th, at Highworth, Reigate-road, Reigate, Sydney Gilbert, L.R.C.P. & S., L.A.H., L.M.
LEE.—On August 15th, at Box, Wilts, Edwin Lee, M.R.C.S., M.D., J.P. (late of Dewsbury).
RANDLE.—On August 10th, at St. Ruan Minor, Cornwall, Dr. James Mayne Randle, aged 74.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

LANGHO EPILEPTIC COLONY.—The Manchester Union has issued its report on this institution for the year ended in March last. The accommodation provided is for 240 men and an equal number of women, with a hospital of 32 beds. During the year the average number of patients was 456. Since 1908–9, when the average number of fits per patient per annum was 114, a steady improvement has been obtained, the number being 29 in the year of the report. The treatment consists of regular diet, appropriate medical treatment when necessary, and open-air employment. The colonists who are physically fit have regular hours of work—the men work in the gardens and on the farm, or in such occupations as joinery, painting, shoemaking, or tailoring; the women in the kitchen, laundry, or at sewing. Ample recreation is provided; there is a weekly dance and kinematograph entertainment. The staff employed numbers 104 officers, including 55 attendants.

Notes, Comments, and Abstracts.

PUBLIC HEALTH IN BENGAL.

THE population of the province of Bengal at the census of 1921 (excluding the Chittagong Hill tracts) was found to be 46,522,293, an increase of 2·6 per cent. on that of the previous census. (The population of Great Britain was 42,857,144 in 1921.) In Burdwan Division there was a decrease of 4·9, and in Chittagong an increase of 11·9 per cent. The birth- and death-rates were 28·0 and 30·1 per 1000, as compared with 30·0 and 32·7 in the previous year, and 30·8 and 31·3 for the quinquennium (1916–20). This birth-rate of 28·0 was the lowest on record, except 27·5 in 1919, and was lower than in any other province in India except Assam and the N.-W. Frontier Province. On the other hand, only four other provinces, Madras, Burma, Bombay, and Assam, returned lower death-rates. From special investigations carried out during the past five years among a population of 15,000 persons in three selected circles of Murshidabad district, it was found that annual birth-rates varied between 24·1 and 62·90 (average 48·0); and annual death-rates between 30·2 and 88·4 (average 46·9). Dr. Charles Bentley, Director of Public Health for the province, who forwards this report,[1] considers that the normal birth-rate is probably about 46·7 (with a range from 37 to 51), and the normal death-rate about 40·0 (varying from 35 to 50 (or even more). He estimates that the actual birth and death ratios for the year were 38·3 and 40·8, "the probable ratio of omissions in the records being about 27 per cent." Verification of vital occurrences is a matter of considerable importance; in Khulna district it was found that there were 52 per cent. of omissions in the births, and 46 per cent. in the deaths, registered; in the towns it is said to be even worse, the Registration Act being "now largely a dead letter." It is useless therefore to attempt any comparison, or explanation in detail, of the variations that are indicated by the statistics, except those for the city of Calcutta.

Economic Conditions and the Birth-rate.

For the fourth year in succession the deaths have exceeded the births in this province, the excess being most marked in the three districts of Darjiling, Jessore, and Nadia, where the decrease in population has been in a ratio of 13·5, 11·7, and 10·5 per 1000 respectively; in Calcutta district (which, by reason of the disparity of the sexes, has always shown an excess of deaths over births) the birth ratio was 19·1, and that for death 33·5 per 1000. With regard to the general question of the relation between birth-rates and the economic (favourable or unfavourable) condition of the population, Dr. Bentley states that "this correlation, contrary to what is generally believed, is a negative and not a positive one. . . . This is a discovery of the very greatest importance. . . . Increased prices of food grains, while bearing heavily on certain classes of the community, tend in the presence of reasonably good harvests to benefit greatly a large proportion of the population." It would appear, however, that for all classes except the actual cultivators and distributors of the food materials concerned, increase of food prices (unless accompanied by a corresponding increase of income) will diminish their ability to obtain the necessary amount of food. "In view of the facts stated it is clear that in Bengal measures aimed at restricting the prices of agricultural production may be fraught with the very gravest consequences to the health of the population, whose prosperity is almost wholly dependent upon two factors—the general character of the harvest, and the monetary return obtained by the sale of the crops." This may be admitted for the agricultural inhabitants, who form the bulk of the population of the province; but for the three million town-dwellers (who would necessarily be affected), and as a general proposition (the very opposite to the principle of free trade), there is much to be said on the other side.

Deaths due to Cholera, Small-pox, and Other Diseases.

There was considerable increase in the cholera mortality, compared with the previous year (80,547 deaths against 54,199); but in spite of this the death ratio was 4 per cent. below the decennial mean; the ratios per 1000 are not stated, but the actual deaths recorded in the quinquennium, 1911–15, numbered 462,018 (giving an annual average of 92,403), and in the years 1916–20, 377,364 (annual average, 75,473). The disease is usually at its minimum from July to September in Bengal. "Preventive measures should be initiated early in September," and "always pressed with special vigour also in February." The districts most affected were Mymensingh (3·8 deaths per 1000), Bogra (3·5), 24-Parganas

[1] Annual Report of Director of Public Health, Bengal. Calcutta: Secretariat Book Depôt. 1923.

(3·3), and Pabna (3·2); Darjiling escaped altogether. Preventive work is being undertaken (disinfection of water-supplies, use of cholera vaccine, &c.). In Dinajpur district, "wherever the disinfection of wells was undertaken, cholera quickly subsided." Excluding Calcutta, 4607 deaths from cholera were reported in the towns of Bengal, compared with 3863 in 1920; this is said to be "an increase of 42·3 per cent." On the figures given the increase would be 19·1 per cent., but it is stated that "the cholera death-rate is an obvious under-estimate and ought probably to be increased by at least 50 per cent."

There was a great decrease in small-pox mortality, 8157 deaths compared with 36,190 and 37,010 in 1920 and 1919, the corresponding death-rates being 0·18, 0·79, and 0·81 per 1000. "The great decrease is due to the usual periodical decline in the prevalence of the disease following the severe epidemic of 1919–20; the disease tends to recur in epidemic intervals of from five to six years," and 80 per cent. of the mortality usually occurs in the first six months of the year. In only four districts was there an increase over the decennial average (Jalpaiguri, Murshidabad, Malda, and Jessore); the highest death ratio occurred in Murshidabad (0·62 per 1000); in Calcutta it was only 0·10, compared with 1·02, the decennial average. "For the first time on record the returns make some attempt to differentiate between the various febrile affections as causes of death, which have previously all been classed under the general heading "Fevers." Of the total 1,070,368 "fever" deaths, 737,223 are shown as due to malaria; but it is said that probably the deaths due to this cause are only one-half of this figure. In Chittagong division less than one-fifth of the "fever" deaths are now ascribed to malaria. It is stated that probably in the whole province from 20,000 to 60,000 deaths were caused by enteric fever (0·4 to 1·3 per 1000), the deaths so registered only numbering 5693. Only 1537 deaths were ascribed to measles, but probably the number should have been from 10,000 to 25,000. From kala-azar only 1552 deaths are reported, but if the Calcutta death-rate (0·2 per 1000) be "accepted as a fair indication of the incidence of the disease in 1921, the kala-azar deaths throughout the province cannot have fallen far short of 10,000, as against 1552 actually reported." "Plague has almost ceased to figure as a cause of death in Bengal." There were only 66 fatal cases in 1920 and 59 in 1921, of which latter 37 occurred in Calcutta and 16 in Hooghly and Howrah districts. The disease "has now reached so nearly to the vanishing point, that it should not be a difficult matter to eliminate it entirely." The great increase in deaths from "respiratory diseases," which began in 1918, due to the influenza epidemic, continues: there were 11,675 deaths so returned in 1917, 20,901 in 1918, 22,609 in 1920, and 32,367 in 1921. The heading now includes influenza, pneumonia, phthisis, and "other respiratory diseases," and many deaths formerly returned under "fever" are now placed in their proper category. Under influenza 4751 deaths were returned (0·1 per 1000), while in Calcutta the ratio was 1·0 per 1000. Dr. Bentley considers this latter ratio to be a fair representation of the prevalence throughout the province, which on this basis would mean over 46,000 deaths. In Darjiling district, which was most affected, the death-rate from this cause in the rural circles was 2·5, and in the towns of Darjiling and Kurseong, 21·4 and 7·1 per 1000. Pneumonia has now been given a separate heading in the returns, it is one of the most serious causes of death; but "only a fraction of the pneumonia mortality is correctly reported," many deaths being included under "fevers"; 11,567 deaths were returned, of which 3183 occurred in Calcutta. For phthisis the provincial death-rate was 0·1, for towns 0·9, and for Calcutta 2·3 per 1000; but with the exception of Calcutta all the figures are under-estimates. "We must therefore be prepared to see an apparent increase of tuberculosis in the future." The same must be expected in regard to dysentery and diarrhœa, which from the Murshidabad observations give an aggregate of 5·1, while the deaths actually recorded under these headings (22,258) give a ratio of only 0·5 per 1000. There were fewer deaths from suicide in 1921 (3217 against 3509 in 1920); 1819 were among females and 1398 in males, the sex proportions of the population being 22¼ and 24 million respectively. Suicide among females was 30 per cent. in excess over males. In Jessore district the excess was 100 per cent. The population is 1,722,219, of whom 828,627 are females.

Deaths from hydrophobia have increased very considerably: for the years 1918–21 they have numbered 119, 179, 289, and 379 respectively. This "is most disquieting." In the Presidency division there were 170 deaths against 96 in the year preceding. "The need of facilities for preventive treatment is apparent. . . . As urged in previous reports, the question of providing for treatment in Calcutta merits careful attention." We entirely disagree with this opinion: there can be no doubt whatever that *immediate action* is required. Whether Calcutta is the most suitable place for a Pasteur institute, or no, is a matter for consideration, and other localities are available; but there can be no doubt as to the necessity for action. The successful results obtainable by early treatment should be well known in every province in India (if anywhere), and the failure to supply such necessary medical aid is to the ordinary mind inexplicable. The increase of hydrophobia deaths, from 71 in 1917 to 379 in 1921, would (it might have been supposed) have attracted the attention of some responsible authority before now, as it demonstrates the urgency of the need, and accentuates the inexplicable backwardness of the province, as compared with other administrative areas in the country. As far back as 1919, the Sanitary Commissioner with Government of India, referring to the increase in deaths from rabies in Bengal and Bihar, expressed the opinion that "a Pasteur institute more conveniently for these two provinces than is Shillong, seems indicated."

Neglect of Municipal Powers.

It is much to be regretted that, "with few exceptions, the administration of the Registration of Births and Deaths Act was grossly neglected by the municipalities charged with this responsibility. Similar carelessness was displayed in the administration of the Vaccination Act." The municipal authorities in most cases fail to realise that by the use of the powers granted to them they can greatly improve the health conditions of the areas under their control without increasing their expenditure in any way. The expenditure on sanitary works by Government, public authorities, and private individuals amounted to Rs.1,409,883, as against Rs.2,142,539 in the previous year. As an example may be noted the results of the "Flood and Flush Scheme" at Jangipur, in the Murshidabad district: the total death-rate has fallen from 52·7 per 1000 in 1918 to 31·1 in 1921; the infant mortality from 192 to 161, and that from malaria from 13·7 to 5·5. There has been a corresponding reduction both in the spleen index and in the prevalence of anopheles mosquitoes. Anti-malarial coöperative societies are making steady progress under the guidance of Rai Dr. Gopal Chandra Chatterjee Bahadur: there are now 25 branches in existence. "This movement is one of the most promising signs of the interest that has been awakened in disease prevention in recent years, and merits every possible support." Anti-stegomyia work in the ports of Calcutta and Chittagong was carried out by Dr. Batra, and very marked reduction in mosquitoes was effected. "Towards the close of the year orders were received to shut down the work at the end of the financial year." Mr. G. B. Williams, M.I.C.E., chief engineer in the Public Health Department, gives instances of the urgent need for new schemes of water-supply and drainage, and trusts that "if the financial position of the province is restored, one of the first uses made of any balance of funds available to take up as early as possible the programme of urgent sanitary works which is so imperatively necessary for the health of the community." In this hope he will be joined by all sanitarians both in India and at home.

Sanitary Measures: Lunatic Asylums.

In the Report on the working of the Municipalities in Bengal[2] during 1920–21, Mr. S. W. Goode, Officiating Secretary to Government, states that "it is a good sign that for the past few years almost all municipalities have been taking measures to improve sanitation by filling up or clearing insanitary tanks and ditches and by removing jungle; and in several instances effective steps were taken to prevent the spread of cholera and small-pox. The administration of Burdwan Municipality showed much vigour and zeal in obtaining suitable water-supplies, &c., and "the foundations of further progress have been laid." In Dacca Division the municipalities have shared in the difficulties universally caused by high prices, but have carried on their services without loss of efficiency. In Darjiling also the Commissioners are said to be progressive, and anxious to improve the amenities of their town, which is fortunate in the public spirit and mutual coöperation of its municipal representatives, as well as (we may add) the unrivalled beauty and grandeur of its situation. In other cases there appears to be failure of the executive local authority to make full use of the powers they possess. The Commissioner of the Presidency Division observes that "though the main difficulty is want of money, the result for the money spent is, in default of proper supervision, not always the best. Without the growth of a strong public opinion supporting sanitary measures, and vigorous control, there can be no marked improvement under present conditions."

Major T. C. Boyd, I.M.S., officiating Chemical Examiner to Bengal Government, in his report[3] for 1921, states that 1251 medico-legal cases were investigated, as against 1506 in the previous year; the decrease was chiefly due to fewer cases of animal poisoning, 214 less than in 1920, probably the result of the Poison Act. There was also a slight

[2] Calcutta: Bengal Secretariat Book Depôt. 1922.
[3] Ibid.

decrease in human poisoning cases, 694 compared with 708 in 1920; opium was the poison most commonly detected.

In the Lunatic Asylums[3] in Bengal, which altogether now have a total capacity of 1121, the total population in 1921 numbered 1210 (including observation cases), as compared with 1261 in 1920, the daily average present being 957, compared with 966. Of these 106 were discharged cured (11·07 per cent. of average strength). The cures were chiefly cases of mania (55), melancholia (21), and insanity caused by *Cannabis indica* (24). There was no epidemic illness, but the average number of sick increased from 116 to 130, and the hospital admissions from 612 to 861; fever caused 222 admissions, mostly at Berhampore; and there were 162 cases of influenza (mostly of a mild type) at Dacca (80) and Berhampore (82). The mortality was 68·9 per 1000 average strength, compared with 105·5 in 1920. Of the 66 deaths, 10 were from dysentery, eight from acute mania, and eight from pneumonia. There was not a single death from accident or injury in any asylum. At Dacca 12·73 per cent., and at Berhampore 61·37 per cent. of the mean population were employed daily in industrial work, which resulted in a total profit of Rs. 14,124. Major-General B. H. Deare, C.I.E., I.M.S., who presents this short report, is to be congratulated on the satisfactory results obtained in this especially difficult sphere of medical administration in India.

Hospitals and Dispensaries in Bengal.[4]

There was some decrease in the number of hospital patients treated in Calcutta during 1921 (445,088 as compared with 482,110 in 1920) owing chiefly to closure of the Mayo Hospital for repairs. The largest attendance of patients was for eye diseases (38,810 against 41,307 in 1920); next to these affections came malaria (37,176 as compared with 44,584); influenza also showed a decrease from 10,494 to 8600. There were only 80 small-pox patients, compared with 1346 in 1920. Cholera was somewhat more prevalent (1446 cases and 365 deaths, against 1335 cases and 295 deaths); also kala-azar (2367 cases, as compared with 1821). Venereal diseases, on the other hand, showed a decrease (20,624, compared with 23,120). The surgical operations performed numbered 44,056, a reduction on those in 1920 (45,223), chiefly due to the closure of the Ripon Street Dispensary. At the district hospitals and dispensaries in the province medical relief was afforded to 7,564,957 patients, as compared with 7,311,782 in 1920. Nearly one-third of these were suffering from malaria (2,350,367, as compared with 2,270,000 in 1920). Cholera also showed an increase from 9293 cases in 1920 to 12,664 in 1921; kala-azar from 5561 to 9198; and leprosy from 2290 to 3831 cases. The scheme for a leper colony has been approved, and a site acquired in Midnapore district. At the various hospitals and dispensaries in the province 131,629 surgical operations were performed, a slight falling off from the record of the previous year (132,058). Major-General Deare, in concluding his report, states that medical relief is hampered in almost all district hospitals and dispensaries for want of funds; permission has been given in certain cases to levy a small fee, the very poor being excepted.

VOYAGE D'ÉTUDES MÉDICALES.

THE first part of the official report of the sixteenth Voyage d'Études Médicales,[5] which took place from August 27th to Sept. 16th, 1922, is devoted to a description of the journey and of the places visited. It is written by Dr. Maurice Gerst, the Secretary-General of the V.E.M., and is an admirable account, as the writer of the present note, who was fortunate enough to take part in this journey can testify. The second part contains a clear and succinct summary of the lectures given at the various stations visited by Prof. Paul Carnot, the scientific director of the voyage, and by Prof. F. Rathery, the Assistant Director. These contain details about the situation of each resort, the means of access, the special features of the climate and the waters, together with the indications and contra-indications. Among the places visited were Bordeaux, Arcachon, Dax, Salies-de-Béarn, Pau, Eaux-Chaudes, Eaux-Bonnes, Cauterets, Bagnères de Bigorre, Luchon, and Toulouse. The book will serve as a pleasant memento to those who took part in the sixteenth voyage, as well as a useful handbook of information in regard to the places visited. It is admirably printed and illustrated by numerous photographs and a map. It may be well to state that these "voyages" are a yearly function, and that different parts of France are visited. Places are reserved for a certain number of foreign medical men, and British practitioners desiring to familiarise themselves with French spas have thus a good opportunity to do so.

[4] Ibid.

[5] Le 16e Voyage d'Études Médicales aux Stations Hydro-minerales et Climatiques du Sud-ouest de la France. En dépôt à la Librairie Arnette, 2, rue Casimir-Delavigne, Paris VIe.

CONVALESCENT CARE ON A LARGE SCALE: THE WORK OF THE BURKE FOUNDATION, NEW YORK STATE.

THE Winifred Masterson Burke Relief Foundation, White Plains, N.Y., U.S.A., was founded and endowed by the late John Masterson Burke in memory of his mother. The actual establishment of the Foundation was by his desire postponed until after his own death in 1909, and in 1911 the institutional site at White Plains was purchased by the Foundation trust and work begun upon the grounds and buildings. Standing in 60 acres of land, the institution at present comprises 11 buildings—cottages for men and women, administration and dining blocks, laundry, power house, garage and stable, and superintendent's house—with provision for future extension. The institution was opened in April, 1915, and now holds 300 beds, divided between men, women, and adolescents in various disease classifications. In 1917 the entire facilities of the Foundation were offered to, and accepted by, the Government for military use. In May, 1919, when the Government handed the institution back, it had housed 2000 sick and wounded naval officers, sailors, and marines of the United States and Allied Nations. The review[1] of the work carried out during the two years 1921–23 states that early in this period the post-war reorganisation was completed, and normal institutional work resumed.

Advisory Work and Research Fund.

The Foundation takes an increasing part in the national movement towards systematic treatment of convalescent and "substandard" health conditions, giving facilities for inspection and consultation to those interested in its own and similar work. In 1921 the Frank K. Sturgis Research Fund was established and endowed by the president of the Foundation for the advancement of knowledge of convalescent and preventive treatment. The Fund assists other organisations and publishes and distributes literature dealing with its specialty. The city admission house of the Foundation in New York has become a central information bureau of convalescent and allied welfare; working with other organisations, the Foundation is thus bridging the gap that so frequently occurs between a patient's return from convalescence and his settling down to some suitable occupation.

Régime of the Foundation.

Full use is made of the grounds at White Plains; the question of transportation of convalescents has been studied and the value of distant removal proved, both in order to relieve homes and hospitals near the great centres of population and in order to deal boldly with cases which would benefit by such removal. A 25-mile motor-bus ride from New York tests the patient's reserve and adaptability, enabling him to be rapidly assigned to suitable quarters. The following quotation from the report shows the average day of a "progressing" male guest, and is stated to apply fairly to women and girls also, except that the latter play games and walk less.

"Rise at 6.30, no bathing requirements; walk or sit out; breakfast 7.30, make bed and tidy room; morning papers, smoke (no repressions), wash and repair own clothing, go to 'canteen,' library, or barber shop; play games outdoors and in, walks or light gymnastics; glass of milk at 10, prescribed occupation 10.30 to 11.30; rest, dinner at 12.30, 'rest-hour' 1 to 2, flat on bed with no talk (longer for weaker ones); play in or watch outdoor sports and tournaments, go to village a mile away, or do a few hours of work on farm grounds or buildings if on pay-occupation; supper at 5, rest, walk, or games, read or write letters, dance and entertainment in assembly, lights out and bed at 9."

All convalescents come before the medical officer at intervals of from one to two weeks, for discharge and other decisions. Emergency medical service is always ready. "Nearly all brought medicines are taken away, as well as crutches, canes, and appliances, at the earliest feasible time. 'Doctoring' and doctor-thinking is discouraged and replaced rapidly by formative near-normal interests and activities. The narrow drug-list used and the year's small total quantity for 6000 persons incites frequent incredulity. Nearly all begin what would become a series of complaints, but are met by the advice: 'Lie down, have temperature taken, skip a meal.' They are soon seen pointing for the dining-room and in three or four days the fears and introspections are past. Hydro, electro, and like physical therapies are not given, mainly for anti-neurotic reasons and because something better is provided."

Women, it is noted, generally wish to remain too long, and men to leave before recuperation is completed. Emphasis is laid on the importance of judging each case individually,

[1] The Winifred Masterson Burke Relief Foundation. Fifth Report, 1921–1923.

and of taking into account handicaps, chronicity, and conditions of home and employment. Men and women are encouraged to meet in an atmosphere of middle-class social activity. The advantages of giving even the badly crippled a period of change and rest are pointed out, among them being that of temporarily "resting those left at home by taking out a worn and wearing member" of the family.

Prevention and Specialties.

It is estimated that one-fourth of the adult working population of the United States is in a condition of health sufficiently below the normal to warrant recuperative rest. The Foundation records slow progress in its effort to procure a larger proportion of "preventive" patients, with whom, as a class, results are most satisfactory. With regard to the special conditions treated, 80 beds are set apart for cardiac cases. Mild borderline nervous and mental cases are also taken; over a hundred of these types have already been returned to ordinary life, with a high average of improvement. Cases of lung abscess, hyperthyroidism, chorea, empyema, gastric and intestinal ulcer, "pre-tuberculosis," &c., have been benefited.

Nursing and Surgical Services.

One nurse to four or five infants and small children and, under favourable conditions, one nurse to 50 adults is the ratio of service; this ratio, it is pointed out, has only been attained through a system of generous enlistment of "patient-aid," which is of great therapeutic value to the assisting patients themselves. The actual expert staff consists of a directress, an assistant, three graduate day charge nurses, one nurse in charge of surgical dressings, one nurse for night supervision, and "three 'practical' nurses as aides." The head nurses are allowed to treat and advise medically to a considerable extent, their principal effort being to overcome the frequent desire of convalescents for drugs and medicines. Surgical dressings are made as simply and infrequently as possible and wound-coverings are reduced to a minimum. Convalescents with persistent wounds, sinuses, &c., are sent home to be handicapped wage-earners under private or dispensary care.

Diet, Occupation, Recreation.

Practically all grades of patients from New York City are stated to be "comparatively high and expensive feeders, with an unusual variety of fixed food ideas." At White Plains special dieting is not favoured; a carefully considered standard dietary is given, which results in the correction of many digestive and physical faults. "Obtain the right attitude towards food and exercise and the rest of the normalising process is easy." All patients after a few days of rest are given one or two hours of work daily. The work is prescribed in detail by the physician and is graded from sewing, basket-work, &c., to active gardening and work in the grounds. Women do all the sewing for the institution. "Long stayers" are given "pay occupation"—a modest wage for three to six hours' work about the grounds—and often pass into the regular employment of the Foundation. Recreation includes all manner of indoor and outdoor games, music, dancing, organised walking, &c. The extensive athletic fields of the Foundation are open to the Westchester County High School leagues and other organisations. The value of witnessing good sportsmanlike play is emphasised.

Conclusions Drawn from the Work of the Foundation.

From the eight years of the Foundation's work, covering 40,000 patients, the following conclusions have been drawn by the authorities in charge:—

1. Right selection of patients, keeping to the convalescent and preventive classes, is of the first importance.
2. Individualised term of stay avoids the waste and injustice of a set period.
3. Importance of the play and work and "help each other" therapies.
4. Selected cases of heart disease should be admitted in moderate proportion to all convalescent homes, as well as to special heart institutions.
5. Different ages, classes, sexes, races (with a few exceptions)[2] are successfully treated together.
6. A home-like atmosphere is not desirable; a measure of frank institutionalism, "with its democracy and momentum," gives superior results.
7. These institutions are useful as testing places for the patient's physical and general abilities and fitness for productive life.
8. The seriously ill may be safely returned over long distances in modern motor-cars.
9. More convalescent provision is required for the milder borderline nervous and mental cases, for certain respiratory conditions, for orthopædic cases, and for preventive phases generally.
10. Extension of convalescent facilities throughout the United States is essential for a balanced advance in public health work.

[2] "Coloured" convalescent patients are not admitted at White Plains. A small branch home for these patients at Valhalla, N.Y., was opened in 1915 in connexion with the Burke Foundation, but had to be closed after the entry of the United States into the war. Since that time help has been given in the form of recuperation at home and in country houses.

RIPENING AND ROTTING OF HARD FRUIT.

IN a recent publication of the Food Investigation Board (Special Report No. 12. H.M. Stationery Office. 4*s.* 6*d.*), Mr. Franklin Kidd, D.Sc., and Mr. Cyril West, D.Sc., deal with the common disease of apples and pears known as "brown heart." This consists essentially in the death and subsequent browning of the internal fleshy tissue of the fruit while the peripheral flesh generally remains sound. Slightly affected apples seen in cross section show small patches only of brown tissue. The disease does not appear externally except that to the expert the fruit has lost its characteristic springiness on handling. The authors in a long series of investigations have shown the relation of this functional disease to the atmosphere in which the fruit is stored. Apples and pears which remain free from blemish when stored in air, develop this tiresome defect in atmospheres containing percentages of CO_2 above a certain danger limit. Below this limit the fruit tolerates CO_2 and low O_2 percentages without injury, and such conditions may be employed to obtain a beneficial retardation of ripening in storage The critical limit of CO_2 content is about 13·6 per cent.

FACTORY GIRLS' COUNTRY HOLIDAY FUND.

To the Editor of THE LANCET.

SIR,—Will you allow us to make a very urgent appeal for the Factory Girls' Country Holiday Fund? Our funds are exhausted, but we have many girls and women anxiously hoping for at least a week's rest at the seaside before the winter. The need for this little rest and change is probably more urgent than ever before. Trade depression has resulted in the girls being the main support of thousands of families, who but for their earnings would be on the verge of starvation. The general standard of comfort in the average home is lower than it has been for many years, and the health of the community in the crowded and airless factory districts of London has deteriorated considerably. Nor has it been possible for the girls to contribute as much towards a holiday as they have done in former years. Good food, rest, and fresh air for a short time will make it possible for many to continue their work through the winter, who would otherwise break down under the strain and privation they have had to bear for so many months. The short holiday will give them fresh hope and courage. Subscriptions and donations will be thankfully received and acknowledged by the treasurer, Mrs. Rendel, or Miss Canney, 75, Lamb's Conduit-street, London, W.C. 1.

We are, Sir, yours faithfully,

A. F. LONDON. FRANK LLOYD.
ALBERTA SANDWICH. F. H. HERTZ,
LOUISE CREIGHTON. Chief Rabbi.
MARY ST. HELIER. ROBERT F. HORTON.

August 23rd, 1923.

MEDICAL ACCOUNT-KEEPING SIMPLIFIED.

To the Editor of THE LANCET.

SIR,—It is generally recognised that members of the profession are not enamoured of account-keeping. May I suggest to them an easy method, which I have adopted for some time, and found both simple and time-saving; the necessary arithmetic being reduced to the simple form, the compound form being entirely eliminated. By reason of the fact that fractions of sixpence are never used in medical accounts, it becomes an easy matter to decimalise by using the shilling as unit, and treating the 6*d.* as half-shilling or five-tenths. Thus, such amounts as 21*s.*, 10*s.* 6*d.*, 7*s.* 6*d.*, 5*s.*, 3*s.* 6*d.*, and 2*s.* 6*d.*, become *s.*21·00, 10·50, 7·50, 5·00, 3·50, and 2·50. The ordinary cash columns can be used for the purpose, two only being necessary, the pound column for the integer in shillings, and the shilling column for the fraction. All figures to the left of the first figure of the integer naturally represent half-sovereigns. Coins of this denomination having no name, I have adopted for personal convenience the old one of "royal," familiar in Tudor days for this denomination. Pounds not being in the decimal series do not show themselves, but can be seen at a glance if required by mentally or otherwise halving the "royals." Thus: 125·50 equals £6 5*s.* 6*d.* This decimal method has the additional advantage of privacy, for no inquisitive stranger would understand the figures, should the cash-book by chance be left lying about. It may be noted that there is nothing in the Coinage or any other Act, to render illegal the keeping or even rendering of an account in any denomination we may choose, provided it is intelligible.

I am, Sir, yours faithfully,

Chelsea, August 24th, 1923. W. W. HARDWICKE, M.D.